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DUTY ROSTER
CAR WASHING DETAIL
Connie Rodd
Will Eisner

ERWIN, THE INVENTOR

**This is the story of Erwin,
the boy who lived to invent things.
Inventing was Erwin's only real passion
. . . . . his love, his life.**

What time he didn't spend inventing, Erwin spent reading about inventors great and small—and he thought Rueben Goldberg the greatest of them all.

The record doesn't show whether he ever invented anything revolutionary, or even very useful. But that is not important. As long as Erwin could be inventing something, he was happy.

Then Erwin got inducted into the Army and advanced very rapidly to private-first-class. He soon found his way into an M24 tank, which gladdened his inventive heart—because as everyone knows a tank is an inventor's paradise.

Every mother's son of us who went through basic inventing with our Erector, our tricycle, an alarm clock or two, and maybe even a washing machine, was stopped (to our everlasting frustration) just short of the grand piano.

Not so with Erwin. That M24 was Erwin's piano. His heart sang. Erwin was sure he could re-design that tank and show Ordnance a place or two where they could have done better.

Which, **unlike** other tankers you have met, he proceeded to do.

You could find Erwin out in the bivouac area any hour of day or night, singing to the happy clang of his tools . . . lighting the sky with sparks from his welding torch.

In no time at all his M24 had railings, a flight of steps, clothes hampers, several more machine-guns, a tool locker, two extra escape-hatches, endearing Erwin to neighboring infantrymen in need of rest and concealment.

Then the good life in Erwin's M24 was cut short by an unfortunate accident a few weeks ago in the hills up near Hwachon.

In the late dusk of Friday evening, Erwin's tank was wiped off the landscape by a single round of AP, which found a spot of armor plate that was softened up where Erwin had welded (lovingly, but too long) his beloved clothes hamper.

MORAL? Who knows? If it hadn't been for this one small misadventure that spoiled all his other good and noble works, Erwin might have gone on to great things.

But alas, Erwin has just gone on.

LIFE OF AN AUTOMOTIVE PARTS MAN

I work behind the counter
In an Ordnance supply store,
Sometimes I'm called a "genius"
Sometimes I'm called much more.

I claim I'm no mechanic
Yet when a job gets sick
The mechanic comes to ask me
To make the darn thing tick.

I'm supposed to know the numbers
Of bolts and nuts and gears,
For every car that was ever made
In more than forty years.

I'm an engineer, a machinist
And what not, Oh my Lord,
I'm supposed to be an Edison
Combined with Henry Ford.

But life would be a pleasure
And I'd grin from ear to ear
If the mechanics would just tell me
The Model—Make and Year.

Forrest L. Gibson
Ordnance Corps Technician

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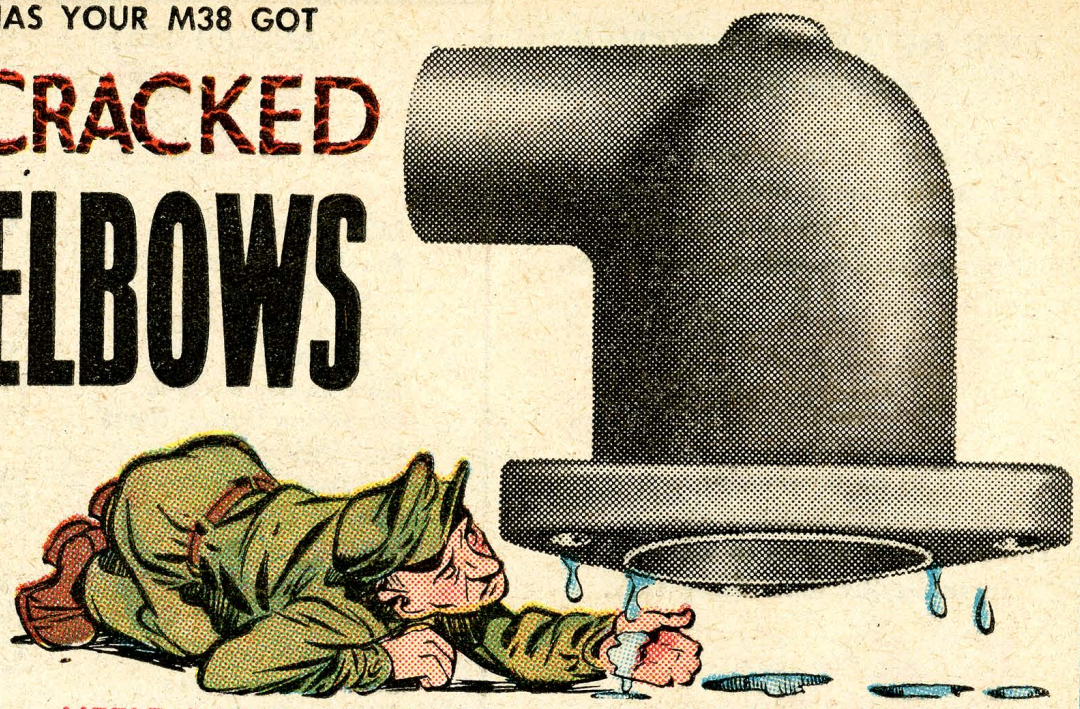
HAS YOUR M38 GOT

CRACKED ELBOWS



LITTLE DROPS OF WATER AROUND THE EDGES WARNS YOU TO LOOK FOR TROUBLE INSIDE THIS CASTING

Maybe yours is and maybe it isn't but don't wager on a leak in your M38's cylinder head at the water-outlet elbow. It could be there.

As you well know, the water-outlet elbow houses the thermostat for your cooling system. In most cases the thermostat within its retainer, fits snugly into the hole in the elbow. They're made for each other. But some of those holes are not deep enough.

What happens, of course, is that the thermostat retainer sticks out of the too small hole—and you don't get a nice flush fit when you bolt the elbow onto the cylinder head. So there's your leak, gasket or no gasket.

If this leak is your only trouble, all you do is to have about 1/8" (or enough to make the retainer flush with the elbow) ground off all the way around the bottom end of the thermostat retainer (see Fig.). Then you put things back where they belong—you may need a new gasket (G503-0194030 Gasket, water outlet elbow)—and you're all set.

It could be, though, that you'll find a cracked or dished elbow when you make that check for leakage. The replacement elbow you get (G503-7371377 Elbow, water outlet) may have a hole deep enough to make a good fit. You'll save yourself a lot of trouble if you'll check it before fooling around with grinding down the thermostat retainer. But if the hole in the new elbow isn't large enough to hold this retainer flush, you know what to do.

The cracked elbows and gaskets resulting from all these too small holes in the castings, can be returned to the manufacturer for credit.

BOULDERS ARE MURDER

Pvt. John Honbyer

I learned about boulders in the high ground up around Taegue one evening last July when my commander and another M24 crew were trying to break out of encirclement by going cross-country. We must have got excited and got ourselves hung up between two boulders. Broke a track connector just like that.

Only one track connector.

Nothing at all happened to the other tank, but we had him stymied. Couldn't move back or front, and he'd used up all his ammo, so was nothing for the guys to do but get out and blow up the tank.

I know this isn't maintenance, but it sure is a lesson for me and those other fellas about good driving in rough country.

Far as I know neither of those tanks ever was recovered.

HATCH LATCHES
Cpl. Sam Schwartz

It was late one afternoon when our M24 recon platoon was going in after an ammo dump up around Chongju. I was assistant gunner in number two tank . . . the hottest spot in the diamond formation . . . when all of a sudden number one uncovered a mine. Must have been doubled up because it blew his right track apart like it was waitin' for because soon's it happened we took three from their mortar squad ourselves and lost our right track too. That was when we tried to get out and couldn't break the escape hatch loose. B-u-r-reu-ther, talk about sweat. No use wishing then that we'd kept those latches at the ready. Nothing left but to get the hell out the main entrance before we got finished off too.

I came out trying to burn up all three bandoliers without takin' a breath, but it didn't help none. I took one of theirs in the right leg, and I feel plenty lucky to be here now talkin' to you like this.

Maintenance? Damright. If I get fit to get back into one of those things, you bet I'll see that hatch is ready to bust out of.

DIRTY FUEL
Sgt. C. F. Proster

I was commanding an M24 in that action from north of Hamchang to the Masan front when most of what we did was to knock out truck columns, mortar and machine gun positions, and pill boxes.

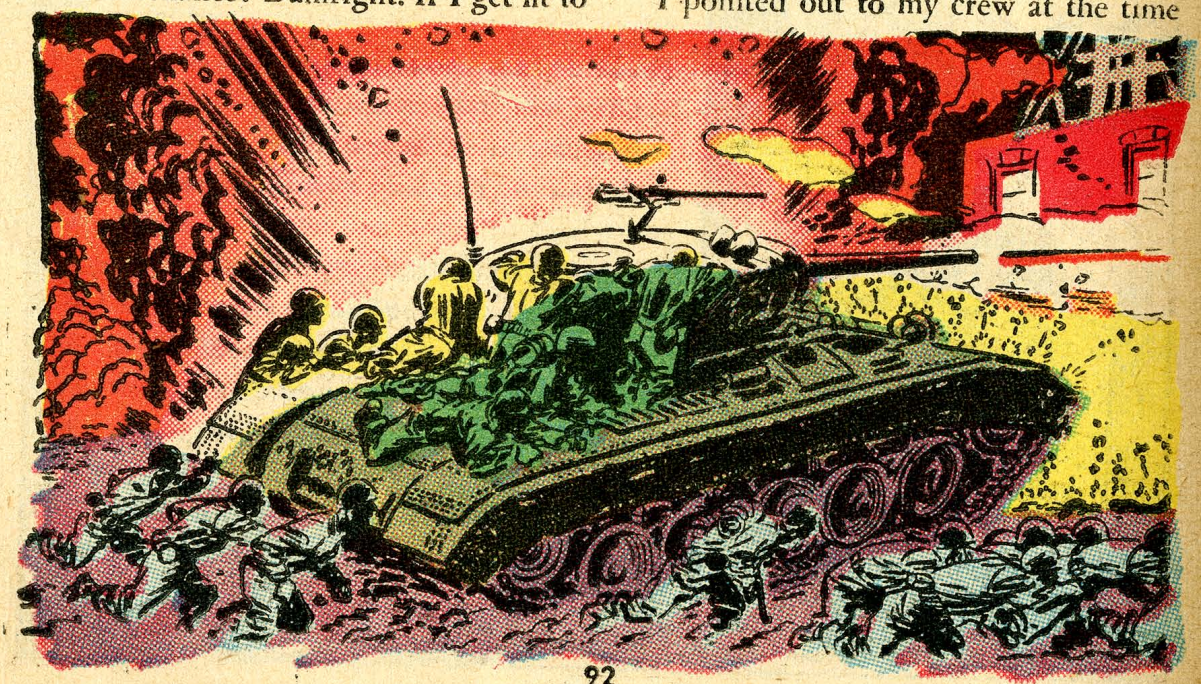
That is, when dirty gas wasn't fouling up our carburetors.

S-o-o-o-o-o . . .

We got ourselves a couple of those fuel filters that go on the ¼-ton and we hooked 'em up to both carburetors. Never had any of that kind of trouble after that, even though we put 3000 miles on the tank all told until the end of that particular action below the parallel.

But even then we figured if those gas handlers had been a little more careful it would have saved us a lot of trouble in the first place.

I pointed out to my crew at the time



what could of happened if we'd been fouled up like that in a real sticky spot. (TB9-729FE4 authorizes an auxiliary fuel filter.)

LOUSY LOADER

Sgt. 1/cl. Art Purcilly

You talk about Joe Dope maintenance, man it's the truth. You never know when you're likely to run into some snag that'll turn your hair solid silver. And do I know it.

One time over there, we're lammin our M24 light tank up a three-mile slope trying with all our might to cover some infantry moving toward Suwon. It's so steep we're getting doused with oil spouting out the filler surge on the final drive, and all the time small slugs and .50's are making strange music on the hull.

Then is when we get this Joe Dope aggravation.

Handles stick on the doors of ammunition wells . . . separator bars have to be knocked loose with a hammer to get the rounds out . . . and shell cases so buggered up it was hot sometimes trying to close the breech.

Lemme get my hands on the goof-off loader that had that tank before we got it and I'll bust his fool neck.

LEARN FROM THE ENEMY

Pfc. Norman Evans

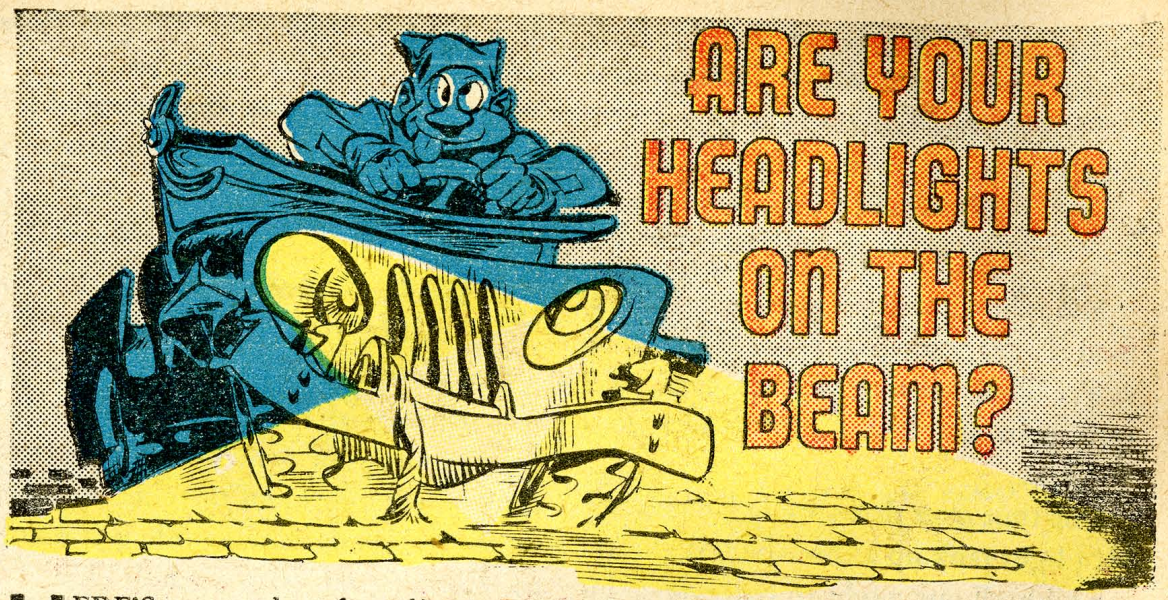
I know you said you want to hear our experiences with maintenance under fire, but I'm sure your readers aren't going to complain if you hand them a few items on operations once in a while if it means their getting out with a whole skin.

My outfit gave the new M46 tanks their first real field testing under fire and we learned a lot of things about them, you might say, from the enemy himself. Like we caught the gooks trying to climb up and drop grenades in the engine hatch.

The order soon came out to bar and lock hatch covers, but the big lesson we learned was to try and think in advance of all that kind of thing before the enemy gets there first.

WHAT'S YOUR COMBAT STORY?

Did you pilot a tank into boulders like Pvt. Honbyer and stick up the whole regiment? Did your crew set a new track-changing record with only a hairpin for tools? Here's your chance to make that hair-raising tale pay off with a free personal subscription to PS Magazine. Write to: Editor, PS Magazine, Aberdeen Proving Ground, Md.



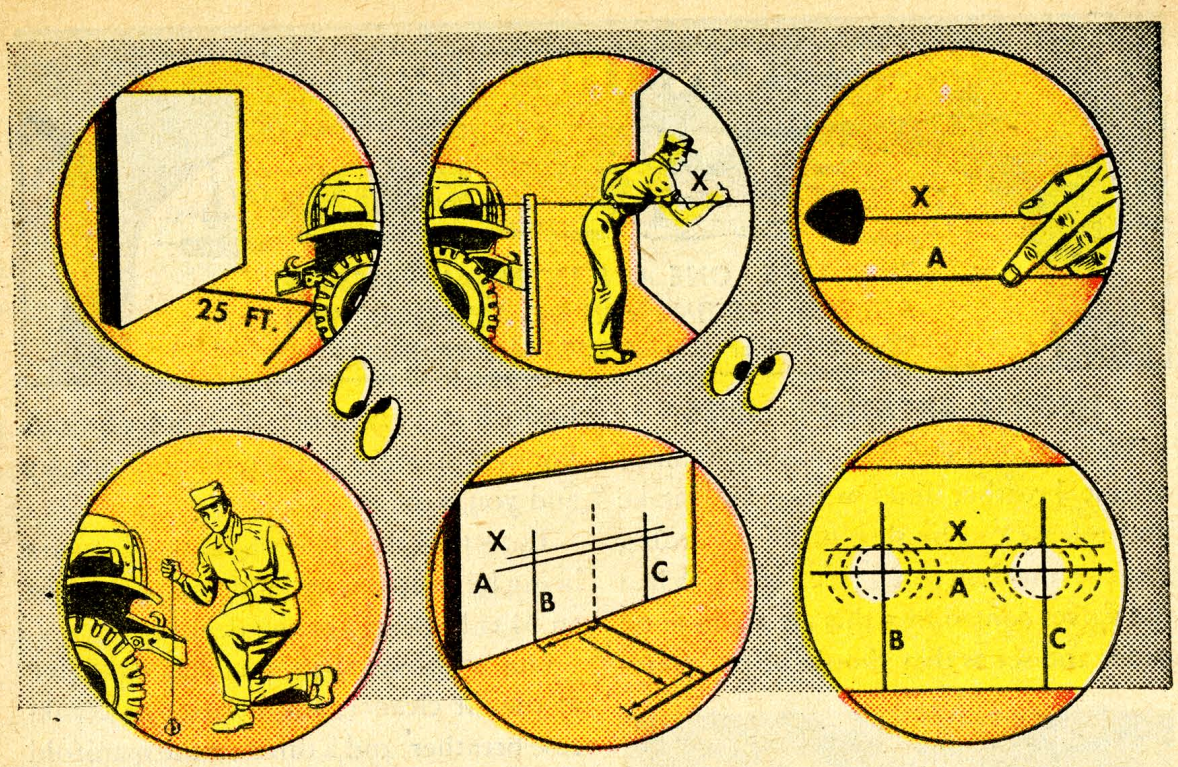
HERE'S a procedure for adjusting the headlights of any and all transport vehicles. It's guaranteed to aim the hot spot of the headlight beam smack into the ground 300 feet ahead—and grounding that hot spot at 300 feet is what takes the glare out of everybody's eyes. (This adjustment is SOP. The authority is TB ORD 247 29(Jan. 45.).

Before you do any adjusting, though, here's a **must:** Make sure your vehicle's got a load on, its rated load. If you haven't got her loaded, you'll be wasting your time. You'll get the adjustment perfect, all right, and the hot spot will hit the dirt at 300 feet on the nose, but the minute you start down that lonesome road with cargo, the adjustment'll be off, plenty. You know why—when your vehicle's loaded, her back end gets weighted down. Her front end rises up at the same time, and the headlight beam tilts up with it. Then the hot spot's glaring at the whites of their eyes instead of at the ground. So you check off the following adjustment when you're carrying a load (in the truck):

(1) Find yourself some level terrain. If there's pavement in the vicinity, fine. Some place on the level stretch, you'll need a vertical surface—a wall or fence, anything that's straight up and down. Now, with a tape or yardstick, mark a line at right angles to the wall and bring it out 25 feet from the wall. Then at the 25-foot mark, draw a straight line parallel to the wall. Your work of art should form an oversize "T".

(2) Drive your vehicle up to the "T" formation so the headlights straddle the 25-foot line and are directly over the straight line atop the "T". Measure the distance from the center of the headlight to the ground. Mark off that same distance on the wall, from the ground up, and draw a horizontal line through that point, directly in front of the vehicle. Call that line **X.**

(3) Now line **X** is the same distance from the ground as the center of the headlights. Measure off 1/12 of that distance and draw a second line just below line **X** and parallel to it. Call the second line **A.**



(4) You're ready now to draw two vertical lines through the two horizontal lines—the vertical lines must be directly in front of each headlight. That can be done accurately by dropping a plumb line (tie a heavy nut on the end of a piece of string) from the center of the headlight to the ground.

(5) Measure the distance, on the ground, from the point where the plumb line landed to the 25-foot line of the "T" formation. Then mark off that same distance on the wall and draw a vertical line straight up. Do it for each headlight. Call these lines **B** and **C**, respectively.

(6) Turn on the headlights now, and find high beam with your selector switch. (You needn't make any adjustment on low beam.) Cover one headlight while you're aiming the other. Aim the headlight so the hot spot of the beam **centers** at the intersecting horizontal and vertical lines **A** and **B**, or **A** and **C**—depending on which headlight you're adjusting.

(7) After you've adjusted each headlight separately check 'em together just to make sure they center up and down on line **A**.

And that's it. If this adjustment were made on all Army vehicles, there wouldn't be any more of that "blindness" that fills the night with curses. You know when you're driving in the dark and some joker comes from the opposite direction in a blaze of light and glory, you don't see **nothing** for the next four minutes. Nothing except maybe a bright red baseball floating around in your own private blackout. And that short period of blindness is enough to send you careening off the road into the valley, or into somebody's tailgate up ahead. Okay, okay—so you do know all that.

The point is: Are your headlights innocent or guilty?

ENGINE BREATHER LINES

Your 2½-ton 6x6 M34 has a system of engine breather lines whose air intake and release can be shut off by a fording knob on the dash panel (see Fig. 1). When the valves controlling this air are in good order and set as they should be set, every-

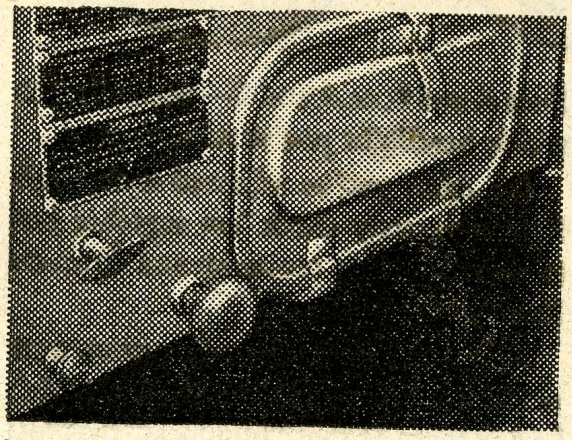


Fig. 1 — By the time you cross your first stream, know this knob and what it does.

thing is fine—because then they'll close only when the fording knob is pulled. You don't want them closed at any other time. Unless you want trouble.

Closing the valves builds up one heap of pressure in your engine and crankcase. This is pressure you've got to have when fording, to keep the water out. Nothing's going to split its seams while you're in the water since the system's designed on the theory that any fording maneuver is limited to very short stretches of time. Enough pressure to keep the innards dry and you moving.

But—take the same amount of pressure being built up on dry land and you've got an M34 bucking for the deadline.

One of those valves is on the intake line at the air cleaner, another on the crankcase breather, and a third on the manifold exhaust (see Fig. 2). Any one or all three of them getting shut off can do damage, anywheres from squirting your oil all over the place to completely wearing out the engine. With no ventilation in the crankcase, you get sludge and corrosion; and unless all the gas and water vapors

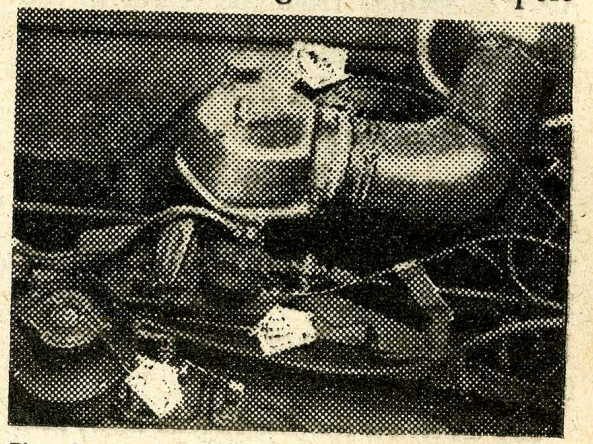


Fig. 2 — The three fat arrows point to the lines that shut the valves for fording.

get carried off as soon as they form, they're going to turn into an acid which eats at the finish on all the metal sur-

faces. Once that finish is gone how long are the bearings, and the cylinder walls, and the pistons, and the this and thats going to last? They don't.

As you can see (Fig. 2), the wires leading from the shut-off valves to the dash control-knob are attached to the valve levers with a set screw. The valve lever is in a correct position when it's smack up against the stop on the connector—and the attached wire should not be dragging it down even the slightest. It doesn't take a full 90° turn down on that lever to close the valve. You can see how slight a turn is needed (Fig. 3) . . . with the lever in this position the valve is tightly closed.

You checked them yesterday, but how about right now before you put the seat of your pants in that cab? Do **you** know how many bumps and jolts it takes to loosen those set screws—or whose stubby fingers may have bent a wire enough to pull down the lever and close the valve? Check it, man, **before** you operate.

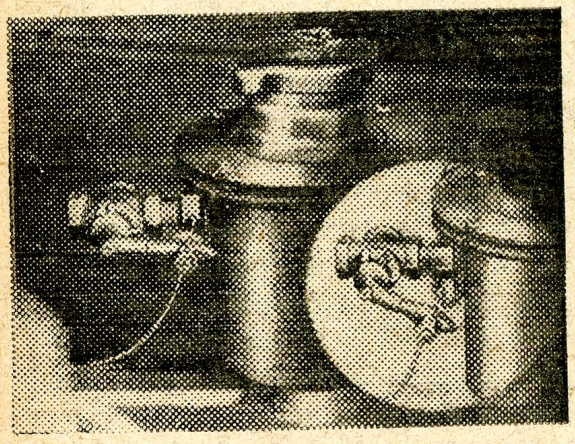


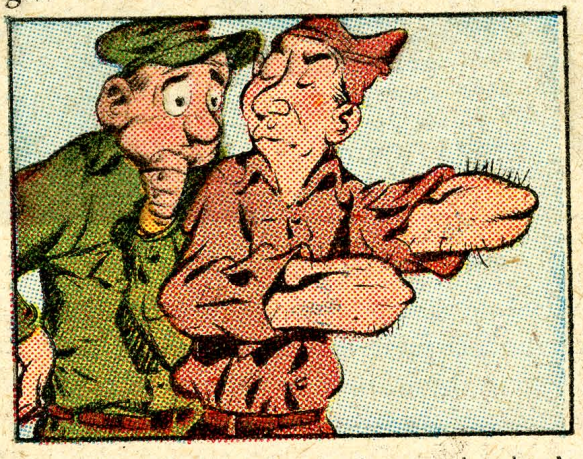
Fig. 3—So you can worry about it, a wire bent like this makes for bad ventilation.

SPARK-PLUG CABLES

How many spark plug cables has your M34 used lately? One more, is one too many. Crossed threads or broken connectors screw up the whole cable assembly, and the threads get crossed and the connectors get chipped because someone in the crowd's got elbows on each hand. (See Fig.). Someone gets careless with one little connector and it necessitates the replacement of a costly assembly. They just don't come separately.

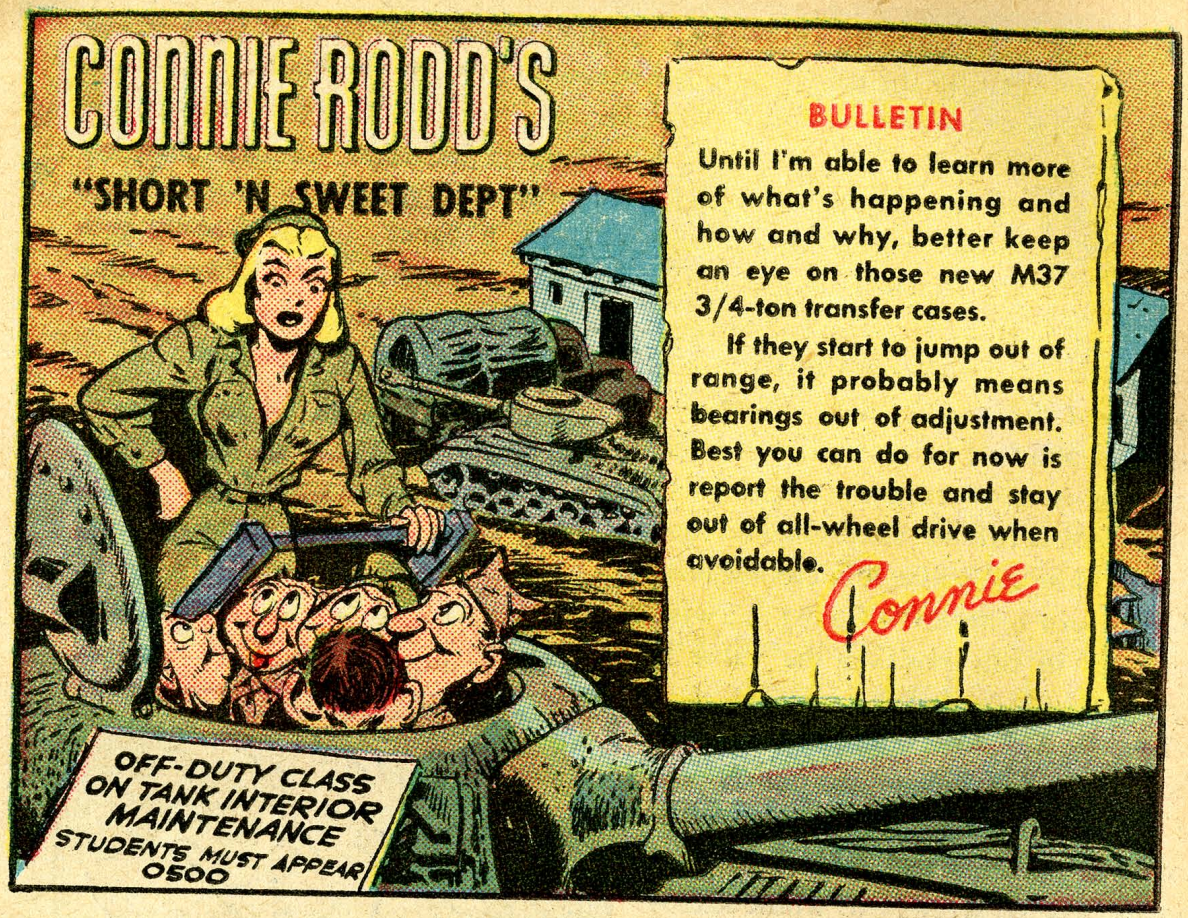
The connector in the tip of that cable is porcelain. Porcelain, like china. Your Ma's best tea-cup wouldn't last for one bang on a cylinder head. Neither do the connectors.

The cable itself isn't very flexible—it gets worse in cold weather — and the plugs you've gotta screw it onto are easy to see but tough to get at. You know. But what you aren't remembering until too late is about that porcelain.



Installing cable terminals carelessly is what breaks these hard-to-get porcelains.

Another thing is that the threads are getting crossed screwing the nut onto the plug. Maybe, since the cable isn't real flexible, and the position's kinda tough even for your special wrench, you should make the nut finger-tight before using the wrench. You can feel better with your fingers anyway.



GMC AXLE END-PLAY

When mechanics disassemble front-axle shaft and U-joint assemblies during the 6000-mile check, they sometimes discard the axle shaft because it seems to have too much end play. This ain't a good idea. Since end play can't be determined after the shaft's been removed from the housing, they often discard **good** axle shafts.

From GMC Service Representative H. A. Wagle comes the following advice:

On the split-type axle, end play is adjusted (after the shaft is in the housing) with shims under the thrust buttons on the differential end of each shaft. The shafts are held in place lengthwise by a screw which pulls the driving flange up against a shoulder on the outer half of each shaft. When the screw's taken out, there's naturally a lot of end play as you move the axle shaft back and forth inside the housing.

Always check the amount of end play in the split-type axle before removing the shaft from the housing: that way you can take out excess play by adding extra shims when you reassemble the unit.

On the banjo-type axle, end play is controlled by bronze thrust rings on each side of the universal joint. The washers work against the ground surfaces of the joint. **To determine the amount of end play in the banjo-type axle, check the condition of the washers when disassembling the knuckles;** and replace the washers if they're worn.

In either type of axle, you're bound to have a certain amount of backlash from worn balls or joints; but you can correct it easily enough by using oversize balls. In the Bendix-Weiss U-joint, since the center ball doesn't get much wear, it doesn't come in oversize.

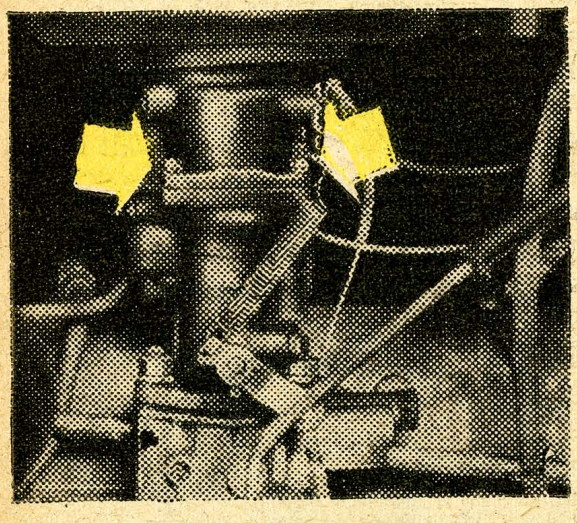
GMC CARBURETOR IDLING

I've got the answer to why a lot of people can't get the Zenith carburetor adjusted for a proper engine idle on the 2½ ton GMC's.

It starts with leaving off the brace that supports the air cleaner on this job. (And why anyone should leave off the brace is beyond me). Then, in order to support the now unbraced air-cleaner, they tighten the already tight screws on the carburetor until blood oozes out. This massacre includes the two screws on the ears of the carburetor. (see Fig.)

If the carburetor is white metal—drawing down these screws causes the bowl face at the throttle body to warp, right along the gasket. The warping makes just enough of an opening to let air leak into the carburetor at this point.

If you can adjust the carburetor to give out a good idle with this air leak present, you're a better man than I am.



WHY A FAN SHROUD?

If you've ever wondered whether the fan shroud and shields on your favorite hack do anything but get in the way, you'll be interested to know they're a good part of what keeps your engine from stirring up a sirocco. So—no matter how unhappy it makes you—better keep your shroud on.

With the fan operating, the shroud and shields act together as a sort of wind tunnel which sends a small hurricane through every square inch of radiator core (Fig. 1) and puts a quick chill on the water inside. This controlled-blow arrangement keeps air from getting a free ride by breezing **around** instead of **through** the radiator (Fig. 2). In addition, it keeps hot air from recirculating through the engine compartment.

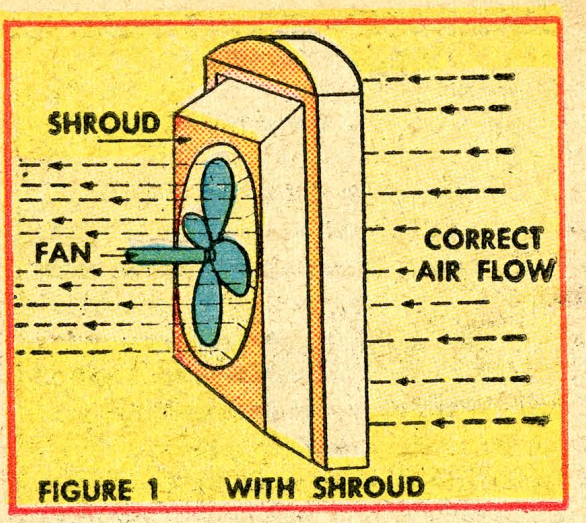


FIGURE 1 WITH SHROUD

Another thing—the hood is also part of this "wind tunnel". It helps pass the cool air back over the engine and if you think it's good to open it when the engine overheats, you're wrong. You'll just have another breeze that blows no good. But, if you keep your shroud on and your hood buttoned down, life'll be cooler in the engine department.

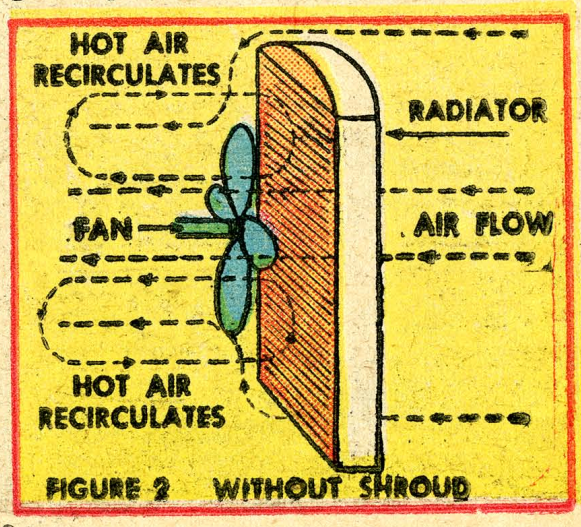


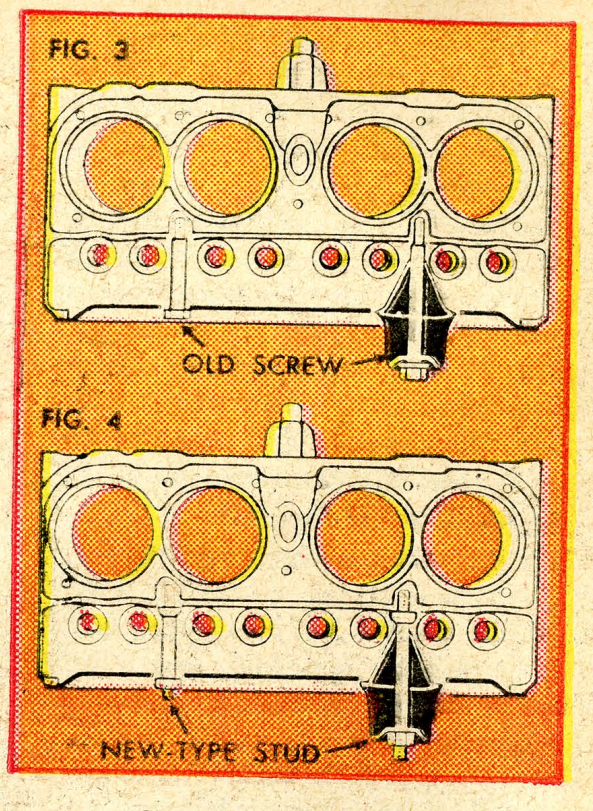
FIGURE 2 WITHOUT SHROUD

NEW STUDS FOR SOME JEEP VALVE-COVERS

If you're a big, brawny boy and you're driving a ¼-ton 4x4 Ford, better leap right out and take a look at the serial number (on the side of the engine). If it falls anywhere between No. **232051** and **243405** (inclusive), you've got a job to do. The manufacturers changed the design of the bosses that the valve-cover screws fit into. What they did was separate the bosses from the cylinder walls (see Fig. 3), using the same screws as formerly. After manufacturing this type for about two months (covering the serial numbers given above), it was found that if you put too much pressure on the screws, they're likely to crack or break the bosses. This'll let water leak into the crankcase.

What you've got to do is remove the two old screws (Mfr's Part Nos. FM-355451-S and FM-355452-S) and replace them with new shoulder-type studs as shown in Fig. 4. You can get these studs through regular channels (front stud, GPW-6547, and rear stud GPW-6548). Before installing, dip the new stud ends up to the shoulders into Permatex (or something similar) so they'll hold tight.

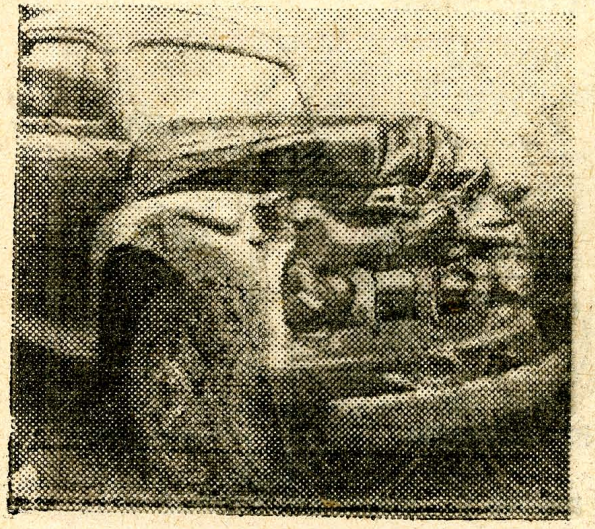
This fixes it so the studs' shoulders will stop you from cracking the bosses.

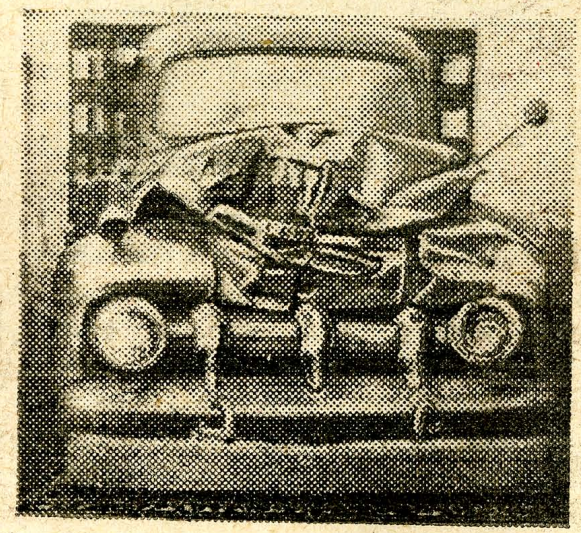


CONVOY-CRACK-UP

Today I am just sick to my stomach. Today I saw what went out a fine and shining convoy, come limping back with its tail chewed up. Count them. FOUR. Not just one lone accident, but four-inside of a few seconds.

What happened? Who's to blame? One of them, a couple, all of them? How can you say? Maybe the speed was too great.





the visibility poor, or someone paid no attention to a stop signal, or maybe didn't pass it back, or there was too little distance between vehicles. Any one or all of those things.

I only know that each driver in a convoy is carrying a couple of loads—the one in his buggy and the bigger one on his shoulders. A worry about the guy in front and the buy behind, and worry about everyone else in the convoy. Because it takes only **one** mistake to travel along the string and crumble the operation.

You know, some guys can walk by those posters with the banner line: WE HAVE THE WORLD'S BEST EQUIPMENT . . . Take Care of it, with a shrug of their big shoulders that says, "—Yeah, yeah, tell it to me again." But not me. I walk by our stuff and hear music like being plugged with a nickle, and light up inside, and straighten my back. I'm proud —**real** proud.

Look at those 1½-tons. You will please excuse me while I exit to the biffy for a good cry. I love that equipment.

OIL-SEAL GUARD FOR HEAVY-TRUCK AXLES

TB ORD 216 provides an oil-seal protector for Autocar, Corbitt, Brockway, White, Mack, and Ward LaFrance trucks. The two oil seals near the outer ends of the front axle-housing are getting beat up when the drive shafts (Timken series F.3100) are removed and reinstalled.

The protector is a snap ring (Class Stock No. 8500-1854-J114). It has a tapered section (Fig. 5) which guides the drive shaft so you don't strike the oil seals.

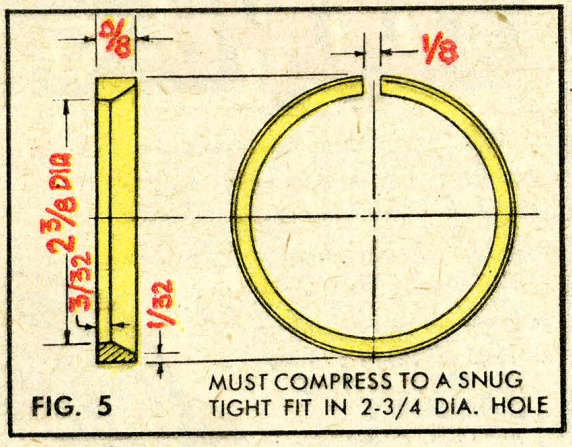
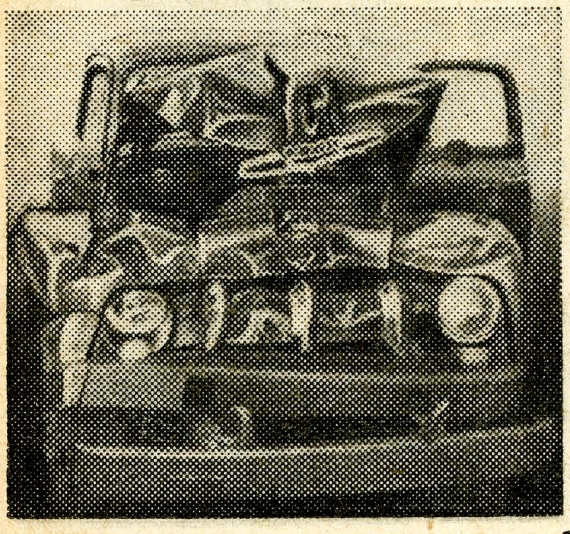
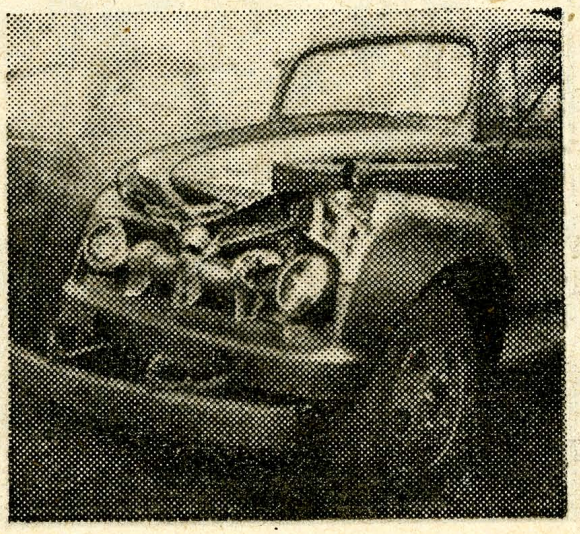


FIG. 5

FAN BLADE CLEARANCE

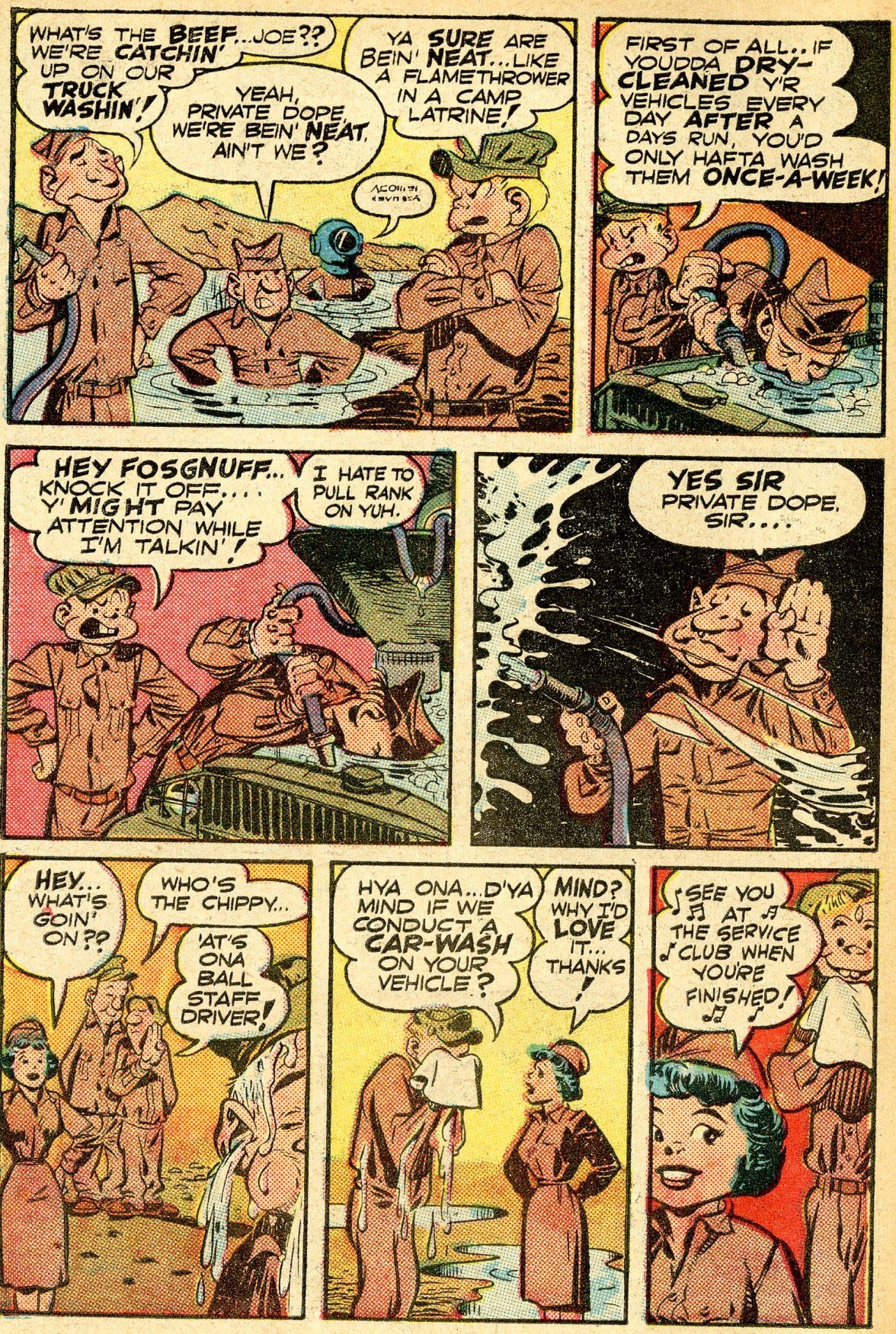
Some M 38's got out with their fan blades sitting too close to the generator. If you haven't already taken care of the noise — maybe it isn't enough to bother you?—get yourself something like a hammer handle and spring the blades away from the generator shaft a little. Later models are already coming through with sufficient clearance between the fan blades and generator shaft, but maybe you don't have one.

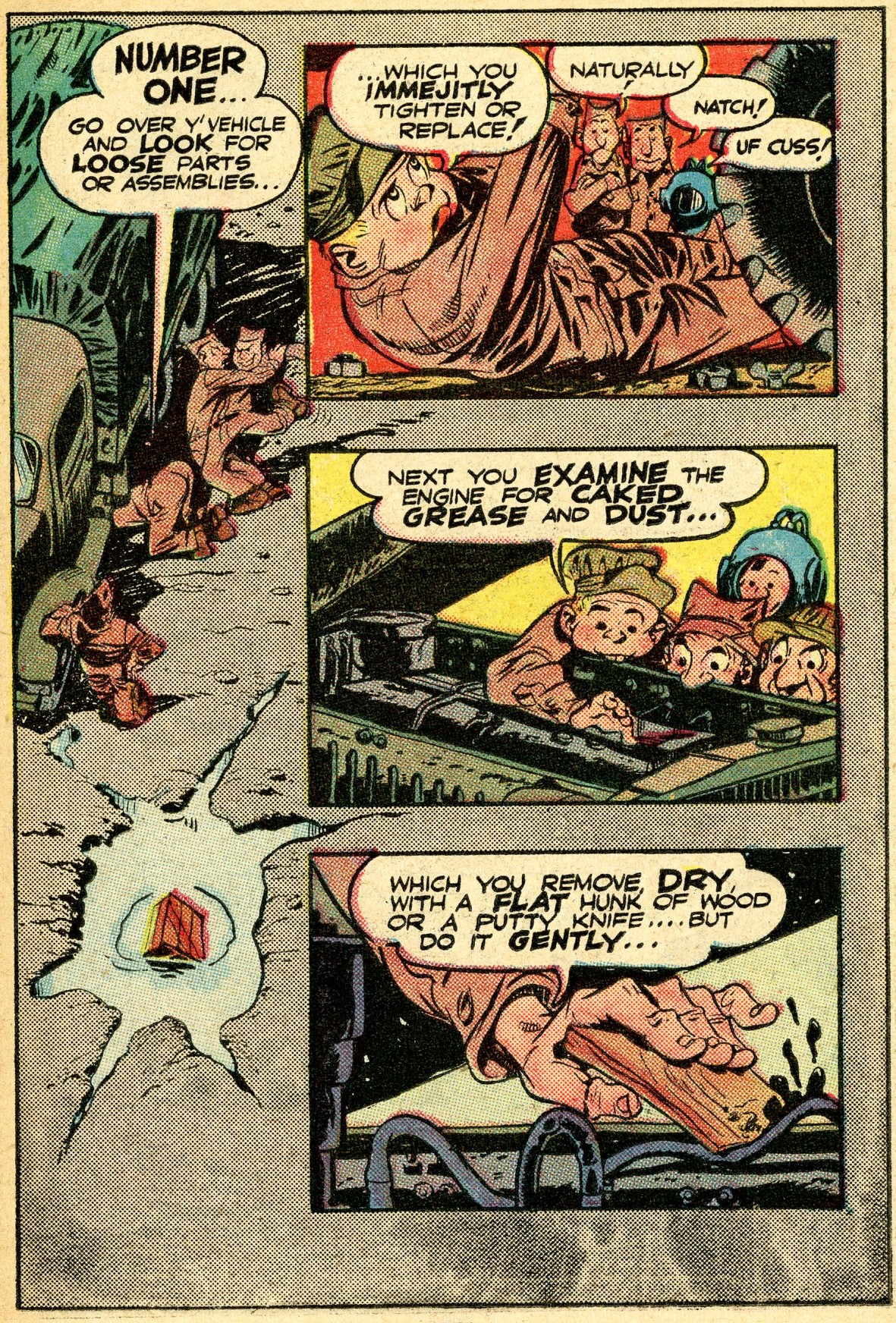




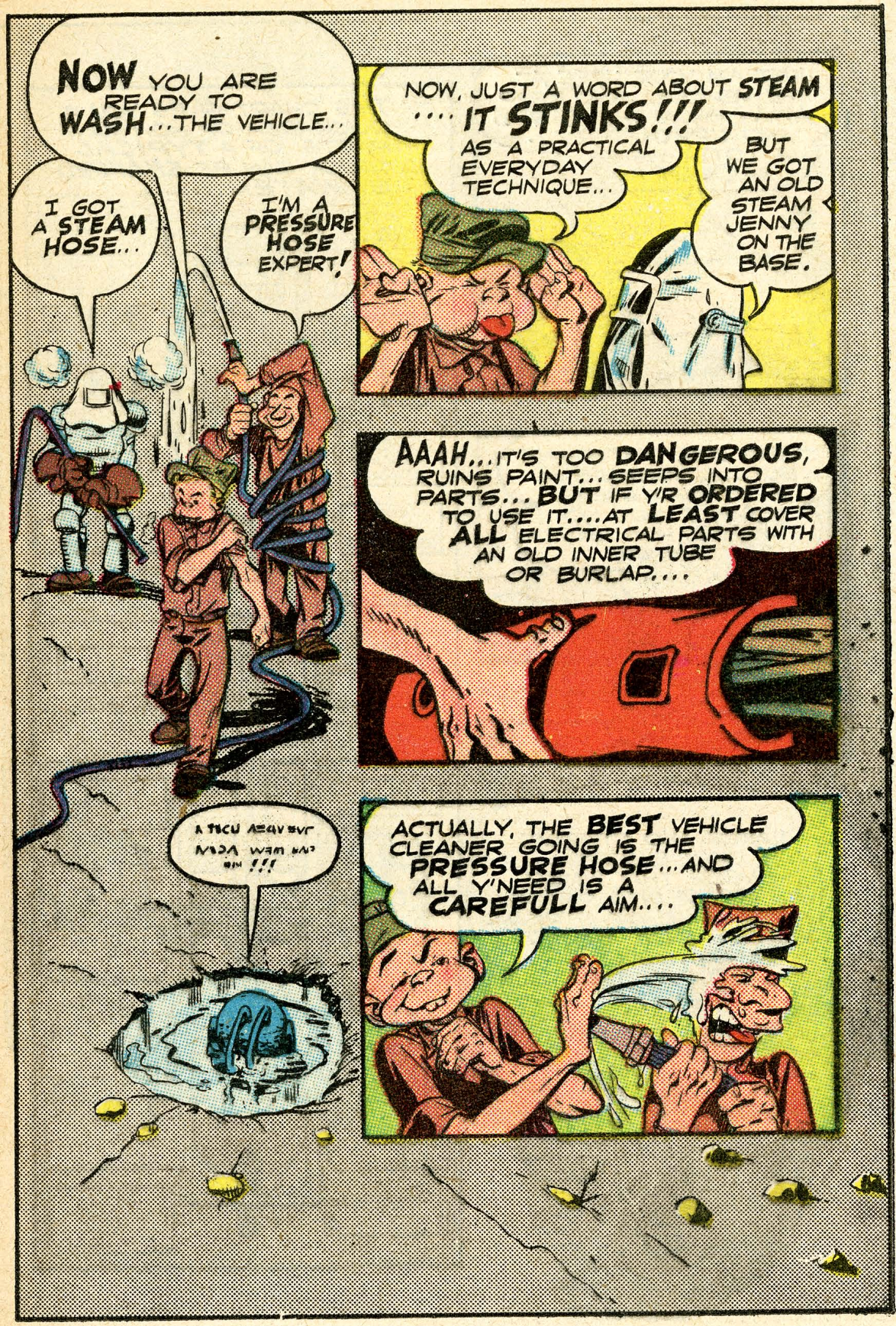
JOE DOPE
HOW TO WASH A G.I. TRUCK
THERE ARE THREE POPULAR WAYS OF WASHING A TRUCK...(a) HOSE, (b) STEAM, (c) WHATEVER THE COUNTRYSIDE OR NATURE PROVIDES... AND BY THE STRANGEST COINCIDENCE, THE RIGHT WAY IS STILL THE EASIEST AFTER ALL.
?
PRODUCED UNDER SPECIAL LICENSE TO U. S. DEPT. DEFENSE
COPR. 1951 WILL EISNER PRODUCTIONS

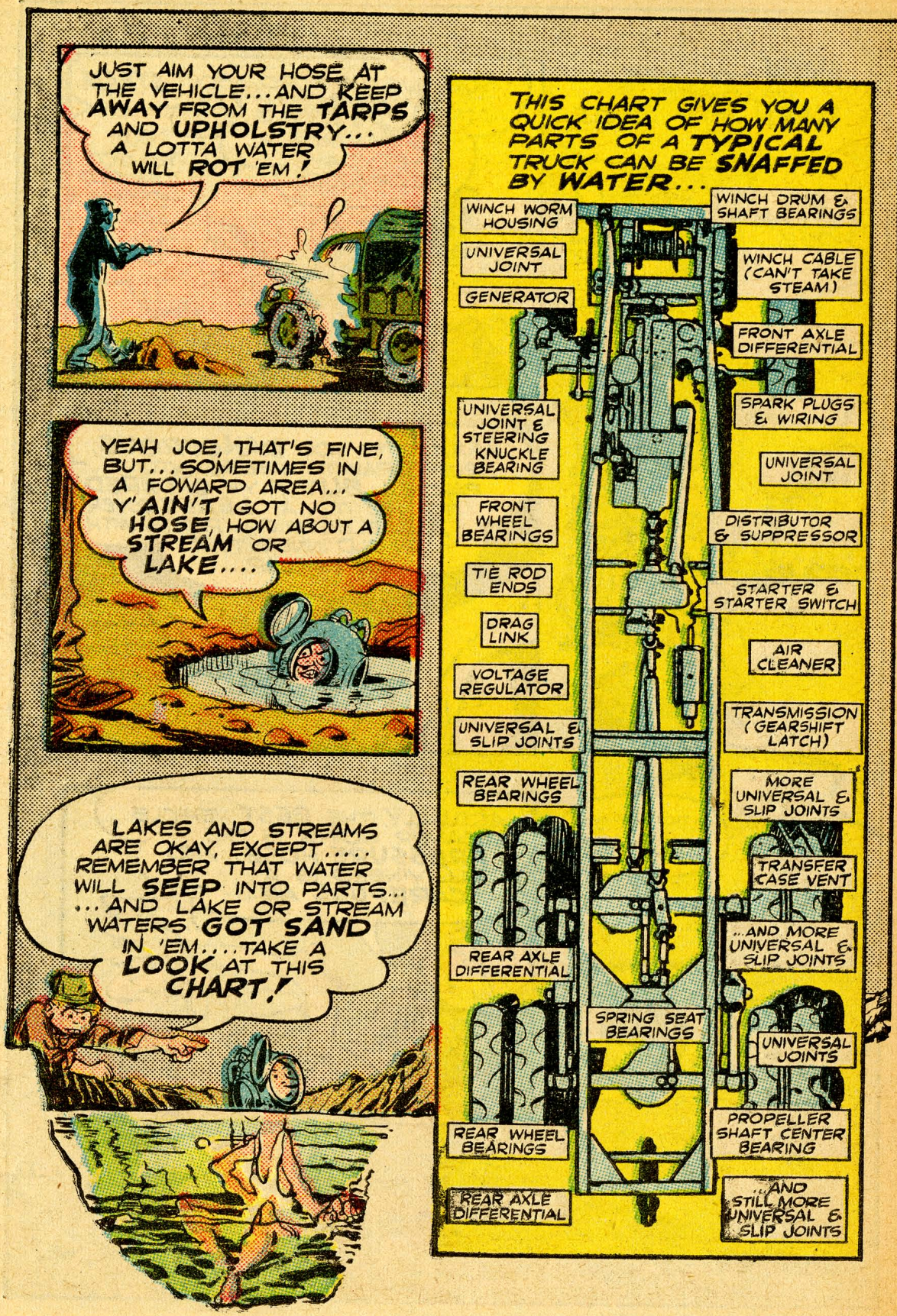
?
!
THIS IS THE WAY WE WARSH OUR TRUCKS...WARSH OUR TRUCKS.... WARSH OUR TRUCKS...
OH NO!!
WARSH OUR TRUCKS
WAIT...STOP...


WHAT'S THE BEEF...JOE?? WE'RE CATCHIN' UP ON OUR TRUCK WASHIN'!
YEAH, PRIVATE DOPE, WE'RE BEIN' NEAT, AIN'T WE?
YA SURE ARE BEIN' NEAT...LIKE A FLAMETHROWER IN A CAMP LATRINE!
FIRST OF ALL.. IF YOUDDA DRY-CLEANED Y'R VEHICLES EVERY DAY AFTER A DAYS RUN, YOU'D ONLY HAFTA WASH THEM ONCE-A-WEEK!
HEY FOSGNUFF.. KNOCK IT OFF.... Y' MIGHT PAY ATTENTION WHILE I'M TALKIN'!
I HATE TO PULL RANK ON YUH.
YES SIR PRIVATE DOPE, SIR....
HEY... WHAT'S GOIN' ON??
WHO'S THE CHIPPY...
'AT'S ONA BALL STAFF DRIVER!
HYA ONA...D'YA MIND IF WE CONDUCT A CAR-WASH ON YOUR VEHICLE?
MIND? WHY I'D LOVE IT... THANKS!
♪SEE YOU♪ ♪AT♪ THE SERVICE ♪CLUB WHEN YOU'RE FINISHED!♪

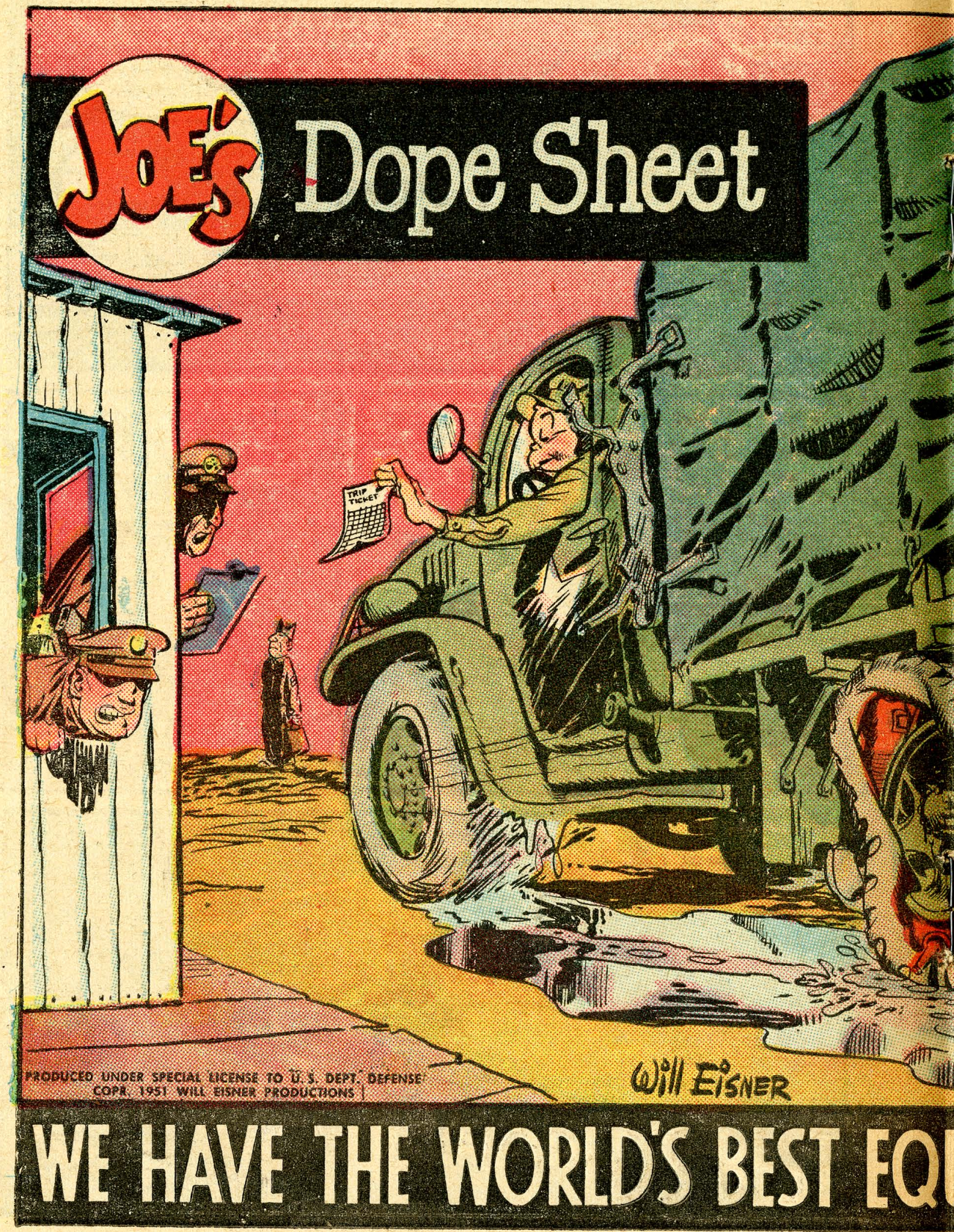

NUMBER ONE...
GO OVER Y' VEHICLE AND LOOK FOR LOOSE PARTS OR ASSEMBLIES...
...WHICH YOU ¡MMEJITLY TIGHTEN OR REPLACE!
NATURALLY
NATCH!
UF CUSS!
NEXT YOU EXAMINE THE ENGINE FOR CAKED GREASE AND DUST...
WHICH YOU REMOVE DRY, WITH A FLAT HUNK OF WOOD OR A PUTTY KNIFE.... BUT DO IT GENTLY...

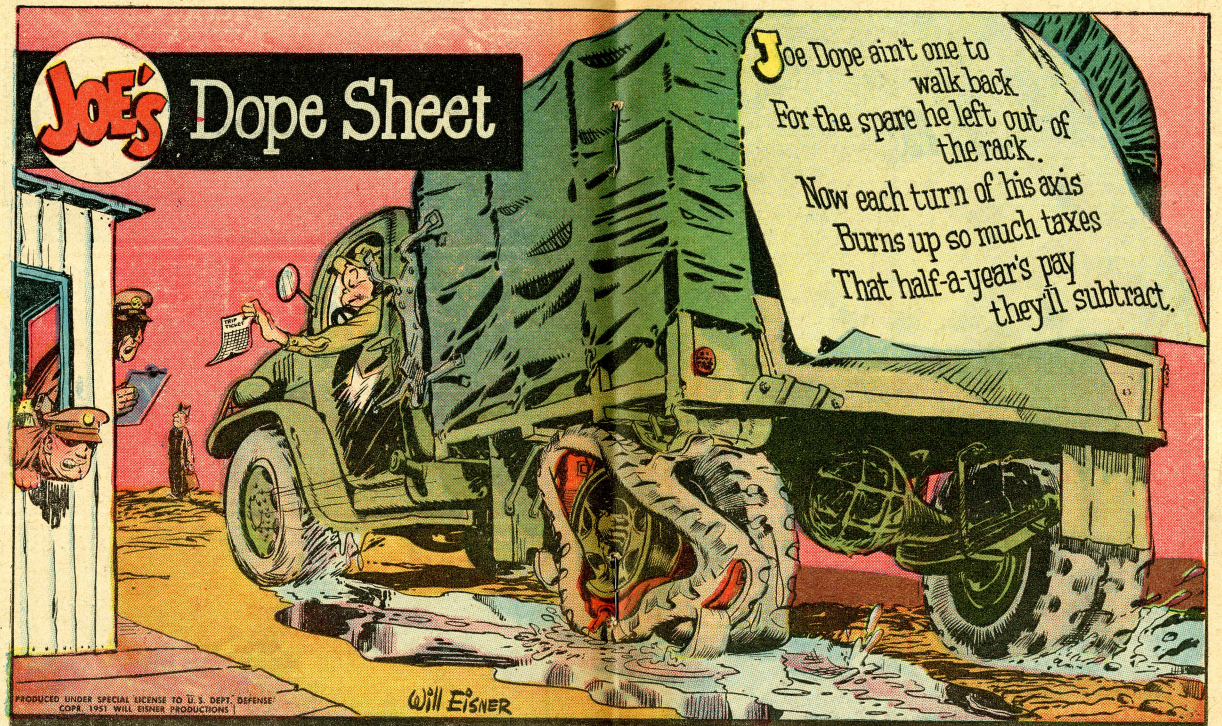
NEXT....Y' SWAB THE ENGINE DOWN WITH A RAG OR A BRUSH THAT'S BEEN MOISTENED.... (NOT SOAKED) WITH A G.I. SOLVENT... NO, NO, NO, NEVER USE GASOLINE!
NOW, WIPE THE ENGINE DRY... BUT GENTLY... AND WIPE THE OUTSIDE BODY PARTS GENTLY.
??* HEY... TAKE IT EASY... THE G.I. PAINT IS DESIGNED TO BE DULL... SO SAVE Y'R ENERGY FOR THE NEXT STEP....


NOW YOU ARE READY TO WASH...THE VEHICLE...
I GOT A STEAM HOSE...
I'M A PRESSURE HOSE EXPERT!
NOW, JUST A WORD ABOUT STEAM .... IT STINKS!!! AS A PRACTICAL EVERYDAY TECHNIQUE...
BUT WE GOT AN OLD STEAM JENNY ON THE BASE.
AAAH...IT'S TOO DANGEROUS, RUINS PAINT... SEEPS INTO PARTS... BUT IF Y'R ORDERED TO USE IT....AT LEAST COVER ALL ELECTRICAL PARTS WITH AN OLD INNER TUBE OR BURLAP....
ACTUALLY, THE BEST VEHICLE CLEANER GOING IS THE PRESSURE HOSE...AND ALL Y'NEED IS A CAREFULL AIM....


JUST AIM YOUR HOSE AT THE VEHICLE...AND KEEP AWAY FROM THE TARPS AND UPHOLSTRY... A LOTTA WATER WILL ROT 'EM!
YEAH JOE, THAT'S FINE, BUT...SOMETIMES IN A FOWARD AREA... Y'AIN'T GOT NO HOSE, HOW ABOUT A STREAM OR LAKE....
LAKES AND STREAMS ARE OKAY, EXCEPT..... REMEMBER THAT WATER WILL SEEP INTO PARTS... ...AND LAKE OR STREAM WATERS GOT SAND IN 'EM....TAKE A LOOK AT THIS CHART!
THIS CHART GIVES YOU A QUICK IDEA OF HOW MANY PARTS OF A TYPICAL TRUCK CAN BE SNAFFED BY WATER...
WINCH WORM HOUSING
UNIVERSAL JOINT
GENERATOR
UNIVERSAL JOINT & STEERING KNUCKLE BEARING
FRONT WHEEL BEARINGS
TIE ROD ENDS
DRAG LINK
VOLTAGE REGULATOR
UNIVERSAL & SLIP JOINTS
REAR WHEEL BEARINGS
REAR AXLE DIFFERENTIAL
REAR WHEEL BEARINGS
REAR AXLE DIFFERENTIAL
SPRING SEAT BEARINGS
WINCH DRUM & SHAFT BEARINGS
WINCH CABLE (CAN'T TAKE STEAM)
FRONT AXLE DIFFERENTIAL
SPARK PLUGS & WIRING
UNIVERSAL JOINT
DISTRIBUTOR & SUPPRESSOR
STARTER & STARTER SWITCH
AIR CLEANER
TRANSMISSION (GEARSHIFT LATCH)
MORE UNIVERSAL & SLIP JOINTS
TRANSFER CASE VENT
..AND MORE UNIVERSAL & SLIP JOINTS
UNIVERSAL JOINTS
PROPELLER SHAFT CENTER BEARING
...AND STILL MORE UNIVERSAL & SLIP JOINTS

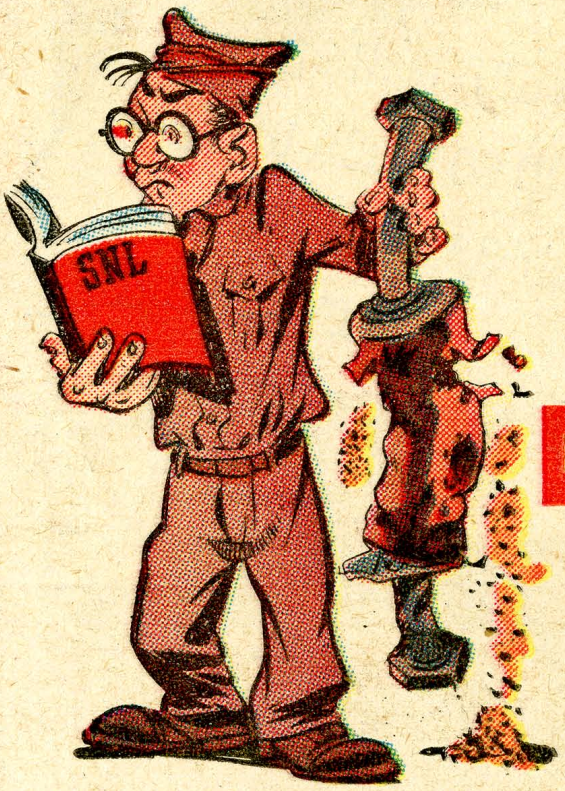
SURE LOOKS PURTY!
OKAY, NOW WHAT?
NOW Y' LUBRICATE...THIS SERVES THE PURPOSE OF SQUEEZIN' OUT ANY WATER THAT MIGHTA GOT LODGED IN LITTLE CORNERS...
BUT...JOE...AIN'TCHA GONNA STICK AROUN' AND HELP???
LISSEN'...I DID MY JOB...YOU DO YOURS...THE VEHICLE IS CLEAN... ...MY JOB IS FINISHED...
...I'M GOIN' TO THE SERVICE CLUB T'MEET ONA, I...HEY... LOOK OUT!
HONK
HONK
HEY, WHERE Y'RUNNIN'?
TO THE SERVICE CLUB... JOE'S GONNA BE BUSY WASHIN' A VEHICLE!
WILL EISNER


JOE'S
Dope Sheet
TRIP TICKET
PRODUCED UNDER SPECIAL LICENSE TO U. S. DEPT. DEFENSE
COPR. 1951 WILL EISNER PRODUCTIONS
Will Eisner
WE HAVE THE WORLD'S BEST EQ


JOE'S Dope Sheet
Joe Dope ain't one to walk back
For the spare he left out of the rack.
Now each turn of his axis
Burns up so much taxes
That half-a-year's pay they'll subtract.
PRODUCED UNDER SPECIAL LICENSE TO U. S. DEPT. DEFENSE
COPR. 1951 WILL EISNER PRODUCTIONS
Will Eisner
WE HAVE THE WORLD'S BEST EQUIPMENT.. Take care of it

UIPMENT.. *Take care of it*

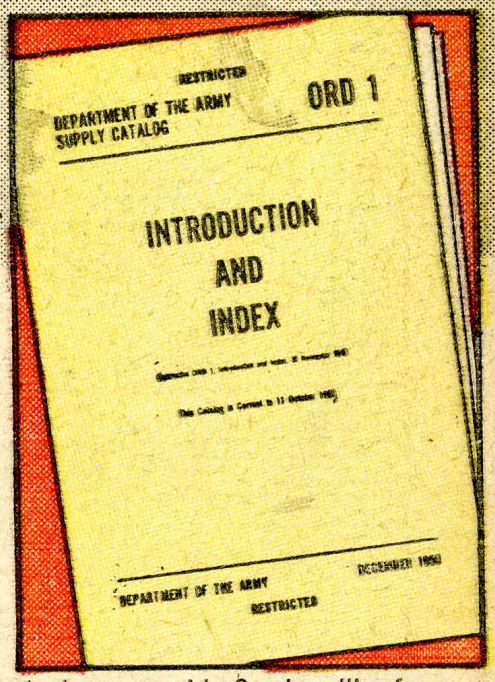
HOW TO USE AN SNL



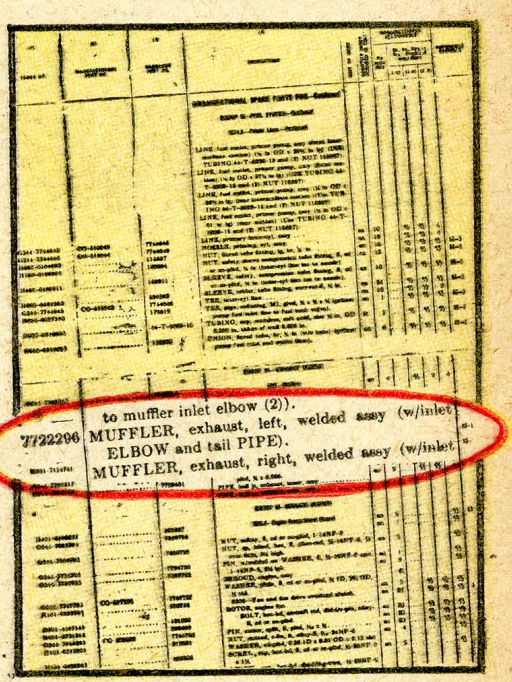
So your muffler got itself air conditioned and your M46 needs a new one, bad. Now all you have to do is order one . . . through channels. And when you're not sure how, ordering through channels can often mean a big, fat headache.

To keep you from hitting the APC bottle, here's the story on how to avoid requisition hangover.

READING FROM



1 Let's start with Section III of your ORD I—this is the book that tells you the correct SNL to use. Section III of ORD I says it is SNL G-244.

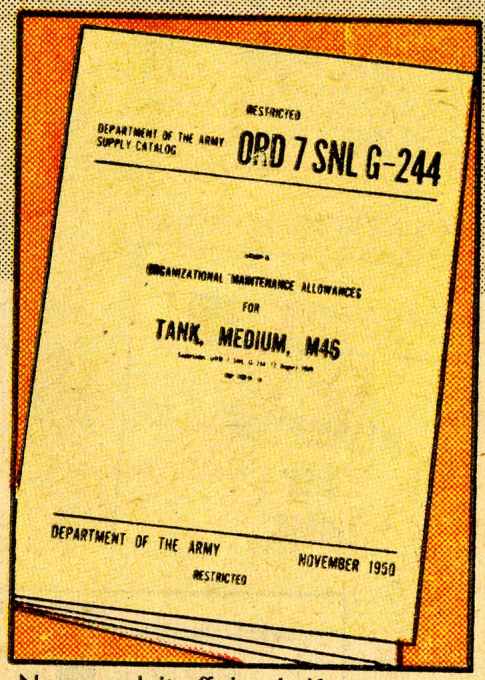


4 Look at Reference Symbol Column on right hand side. If it has a note (as in this case) check with back of book — then fill out the Issue slip.

LEFT TO RIGHT — HERE'S HOW!

Title	SNL No.
Surveillance, ammunition, testing, and inspection equipment and supplies	N-10
System, cable, M1	F-207
System, cable, M2	F-244
System, cable, M8	F-208
System, local control, M18	F-315
System, remote control, M2, M6, M6A1, M13, M13	F-207
System, remote control, M15	F-208
System, sighting, M7	F-252
Table, graphical firing, M22, M23, M24, M25, M26, M26A1, M29, M30, M31, M32, M33, M34, M35, M37, M38	F-237
Tank, light, M24	G-209
Tank, medium, M4, 105-mm howitzer	G-101, Vol 14
Tank, medium, M4A1, 75-mm gun	G-104, Vol 11
Tank, medium, M4A1, 76-mm gun	G-207
Tank, medium, M4A3, 75-mm gun	G-204
Tank, medium, M4A3, 76-mm gun	G-205
Tank, medium, M4A3, 105-mm howitzer	G-104, Vol 15
Tank, medium, M26, M45	G-239
Tank, medium, M46 (T40)	**G-244**
Target, ground, fast moving, M8	L-8
Telescope, M7	F-183
Telescope, M16	F-220
Telescope, M69C, M69F, M69G	F-235, Vol 8
Telescope, M70C, M70D, M70F, M70R, M76C, M76F, M76G, M88C, M88D, M88F, M96C, T104, T180E2	F-235
Telescope, M71C, M71D, M71E6C, M71G, M71K, M71N	F-235, Vol 10
Telescope, M73B1, M81, M82	F-280
Telescope, M76C, M76F, M76G, and T105	F-235, Vol 11
Telescope, M88C (T136E3), T136E3	F-310
Telescope, M96C, T180E2	F-235, Vol 18
Telescope, BC, M55	F-250
Telescope, elbow, M1A1, M6A1	F-231
Telescope, elbow, M10, M10A1	F-185
Telescope, elbow, M16A1C, M16A1D, M16A1F, M16A1G, M16A1M	F-197
Telescope, elbow, M17	F-231
Telescope, elbow, M24A1 (azimuth), M26A1	F-224
Telescope, elbow, M32	F-262
Telescope, elbow, M75C (RH), M75D (LH)	F-231
Telescope, observation, M48, M49	F-173
Telescope, panoramic, M1	F-106

2 You know that ORDs 8 and 9 are for Depot and Field Maintenance—this means that you'll find your needs covered in the pages of the Ord 7.


RESTRICTED

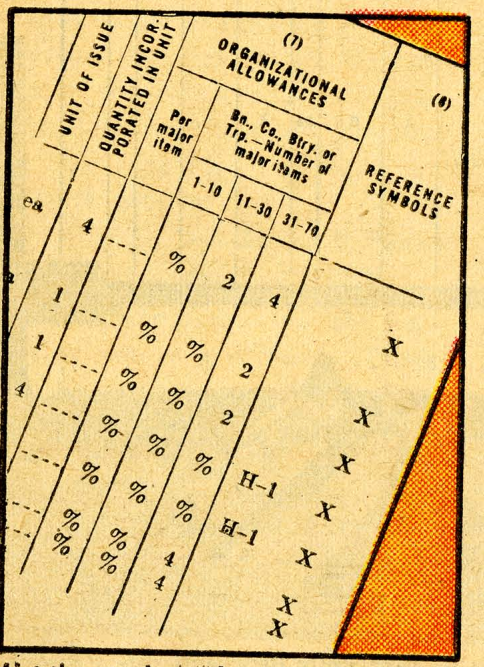
DEPARTMENT OF THE ARMY SUPPLY CATALOG ORD 7 SNL G-244

ORGANIZATIONAL MAINTENANCE ALLOWANCES FOR TANK, MEDIUM, M46

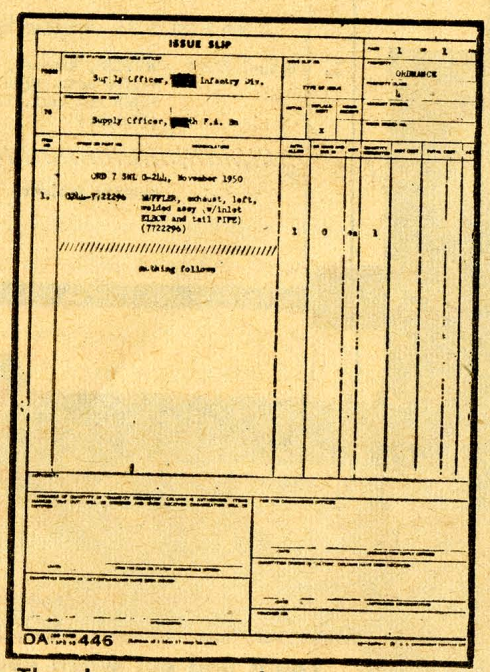
DEPARTMENT OF THE ARMY NOVEMBER 1950

RESTRICTED

3 Now reach it off the shelf—wet your thumb — open it to the "exhaust" group on page 35—read down the nomenclature column to **mufflers.**



5 List the stock number, parts number, nomenclature and quantity. If the Reference Symbol Column is blank—then you needn't look in the back.



6 The clearer you make Issue Slip the quicker you'll get parts. This is how a proper Issue Slip looks . . . and zingo you got y'self a muffler!

RESTRICTED

DEPARTMENT OF THE ARMY
SUPPLY CATALOG

ORD 1

INTRODUCTION AND INDEX

RESTRICTED

DEPARTMENT OF THE ARMY
SUPPLY CATALOG

ORD 7 SNL G-244

ORGANIZATIONAL MAINTENANCE ALLOWANCES
FOR
TANK, MEDIUM, M46

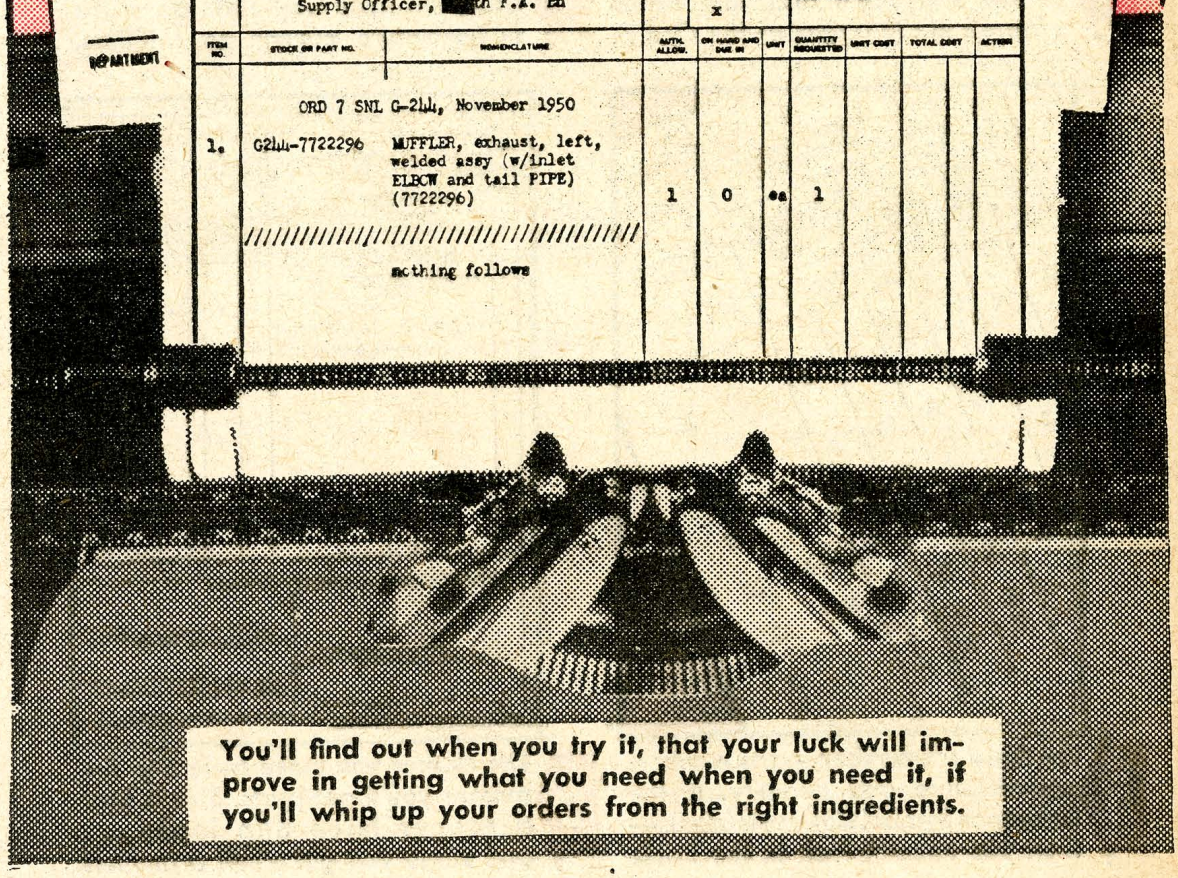
ISSUE SLIP — PAGE 1 OF 1 PAGES

FROM	BASE OR STATION ACCOUNTABLE OFFICER: Supply Officer, [redacted] Infantry Div.	ISSUE SLIP NO.		PROPERTY: ORDNANCE	
		TYPE OF ISSUE: INITIAL	REPLACEMENT: X	PROPERTY CLASS: 4	
TO	ORGANIZATION OR UNIT: Supply Officer, [redacted]th F.A. Bn		MEMO RECEIPT	ACCOUNT SYMBOL	
				WORK ORDER NO.	

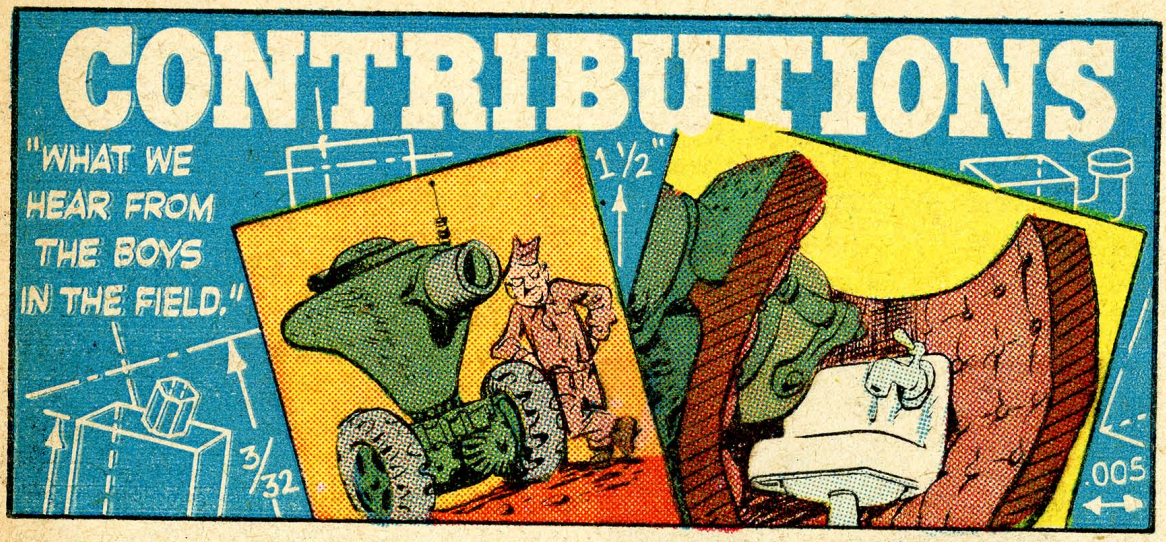
ITEM NO.	STOCK OR PART NO.	NOMENCLATURE	AUTH. ALLOW.	ON HAND AND DUE IN	UNIT	QUANTITY REQUESTED	UNIT COST	TOTAL COST	ACTION
		ORD 7 SNL G-244, November 1950							
1.	G244-7722296	MUFFLER, exhaust, left, welded assy (w/inlet ELBOW and tail PIPE) (7722296)	1	0	ea	1			
		nothing follows							

1950

DEPARTMENT



You'll find out when you try it, that your luck will improve in getting what you need when you need it, if you'll whip up your orders from the right ingredients.



RATCHET FIELD-FIX

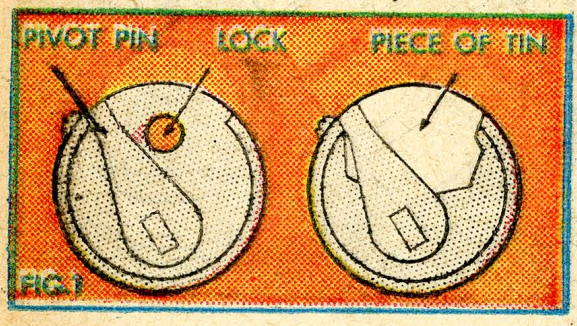
Dear Editor,

I know how important it is to have a ratchet that's working, and how it becomes another piece of junk when it's not working. Here's a fix on the ratchet (SK No. 42470) that comes with the mechanic's tool set.

By taking the ratchet apart, I found out what my trouble was. The pivot pin that comes up to the lock would stop the lock from going from right to left. By cutting a piece of tin from my C-ration can and placing it above the pivot pin and under the lock (see Fig. 1), I got the ratchet to work good as new.

Sgt. Benny R. Pilara
387th. Infantry

(Ed. Note—That's perfect for the particular ratchet you've got, Sarge. There are some other makes issued under the same Fed. Stock No. (41-H-1505) which aren't so easy to take apart.)



AXLE-BEARING SHIMS

Dear Editor,

Both TM 9-801 and TM 10-1563—for the 2½-ton 6x6 GMC—tell you to remove shims to add torque, when adjusting the steering-knuckle assembly on a split-type axle. But what if you have no shims left and still need more torque?

Here's what I'm doing: When the bearings are still in good shape, I take a piece of 0.10 shim stock and cut a 1⅝" hole in it. I trim the outside to fit the shoulder of the trunnions, put them inside of each cone and then add shims.

M/Sgt. E. V. Mitchell

Ed. Note—Inserting those shims will raise up the knuckle-bearing cones and keep the pin bearings from coming loose, but when you put in the shims, make sure the CV joint inside the ball housing has plenty of room to rotate—otherwise that axle is doomed. Shims used under the bearing cups *work fine, too.*

STOP MIRROR FLOP

Dear Editor,

Here's a field fix for all those loose rear-view mirrors.

The ball and socket on the rear-view mirror gets worn so much that the adjusting screw don't tighten enough to hold

the mirror stationary. Rather than replace the whole unit, we insert a coil spring (see Fig.). The tension of the spring will hold the mirror in position.

To prevent rust and resulting wear of the ball socket on good assemblies, apply a drop of oil to the socket occasionally.

Harry Brown
Ordnance Corps Technician

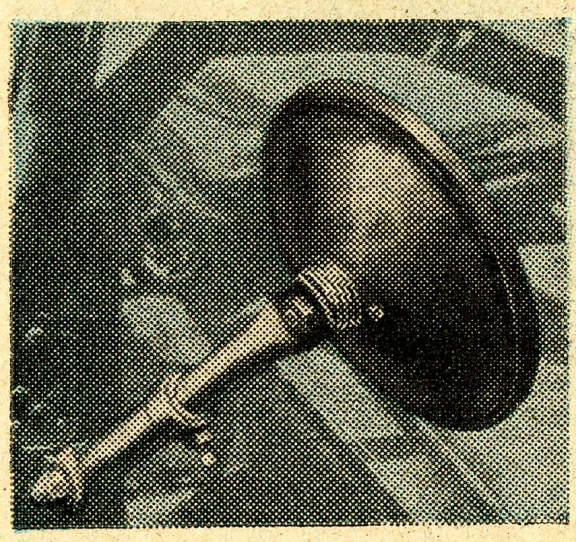


Fig. 2 — Flop stopped by adding a spring.

NEW DIMMER FROM OLD

Dear Editor,

I've found it easy to fix jeep headlight dimmer switches here, where there's "Beau coos" of dirt, dust, mud, and general corruption—causing the dimmer switch to cease functioning properly.

Ordinarily, the mechanic rips it off, aims it at the salvage pile, and hunts through "Parts" for a new one.

I've found that although it's a "crimp" job (which usually means that the "crimped" tongues break off), this one will stand opening up and reclosing several times before the tongues snap off. So, if one that's defective is opened, you'll usually find that a little oil and dirt have found their way inside, where they settle down on the contact plate and contact studs.

A piece of flint-paper (00 grit) and some dry-cleaning solvent will make the switch almost as good as new.

The same goes for the starter switch on the jeep, though here it's wise to use a file and keep the contacts as level and parallel as possible.

Sgt. Edwin D. Meisner

SPARK PLUG MISSED

Dear Editor,

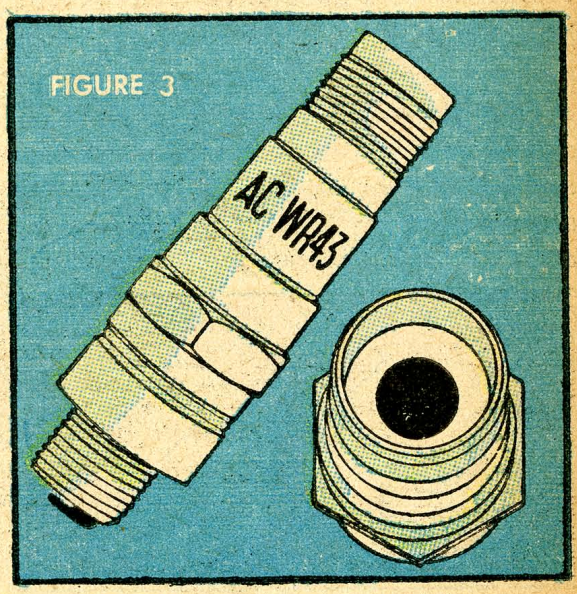
It may have been one of those rare accidents of modern production that one of our AC-WR43 spark plugs had a sliver of metal left in the barrel after all the milling and assembly operations. Or it may be happening right along.

In either case, such a production slip means a shorted circuit in somebody's firing order . . . and maybe, like with us, three-four hours trying to find out why number six in an M 34 was fouling and faltering.

Took so long because it was only big around as a hair and about 3/16" long . . . just the right size to meet up with the spring insert and ground it. (see fig. 3)

Raymond E. Heath, OCT*
Camp Pickett, Va.

***Ordnance Corps Technician**



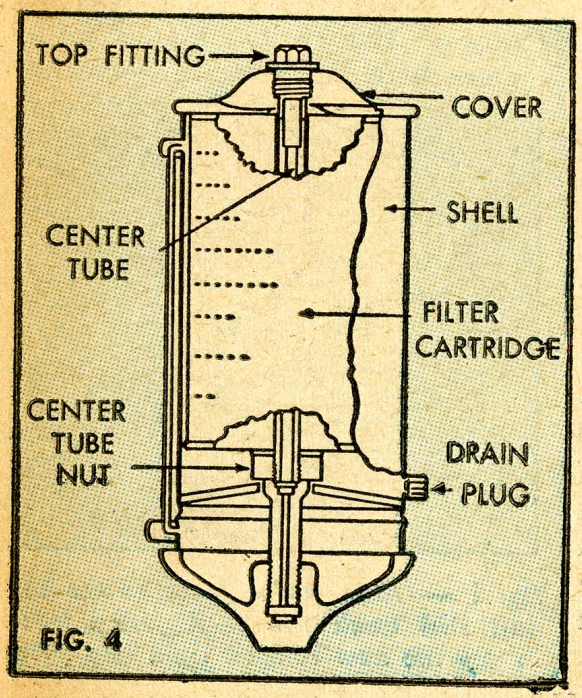
OIL FILTER TOOL

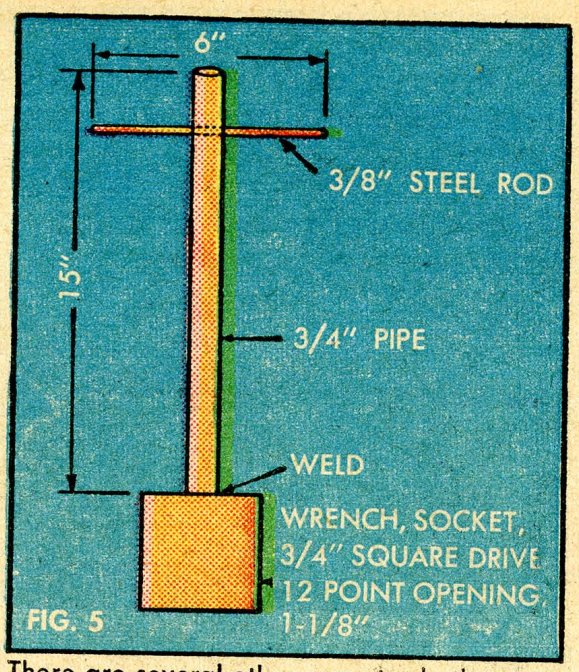
Dear Editor:

Oil filters on the 2½-ton, Model L-171 International dump trucks were giving us considerable trouble, due to the loosening up of the center-tube nut in the bottom of the filter (Fig. 4 below). Up popped Sgt. J. B. Williams, 448th Engr. Dump Truck Company, with a neat tool to take care of this hard-to-get-at nut.

The Sgt. got himself a piece of pipe 15" long and ¾" in diameter. About 2" from one end he drilled a ⅜" hole through it. He then got himself a ⅜" bar of steel, about 6" long, and drove it through the hole for the handle. On the other end of the pipe he welded a 1⅛" hollow socket —and presto! he had a gadget, (See Fig. 5) that worked like this the Sarge first removed the top fitting, cover, and cartridge. He then slid the socket and hollow pipe down over the center tube until it got on the nut at the bottom—gave it a twist-with-the-wrist and the trouble was cured.

Mr. H. E. GRAY
Automotive Technician
Fort Leonard Wood, Mo.





There are several other ways to do the same job; a best open-end wrench, or with the special International wrench which sells locally.

DISTRIBUTORS IN EASY

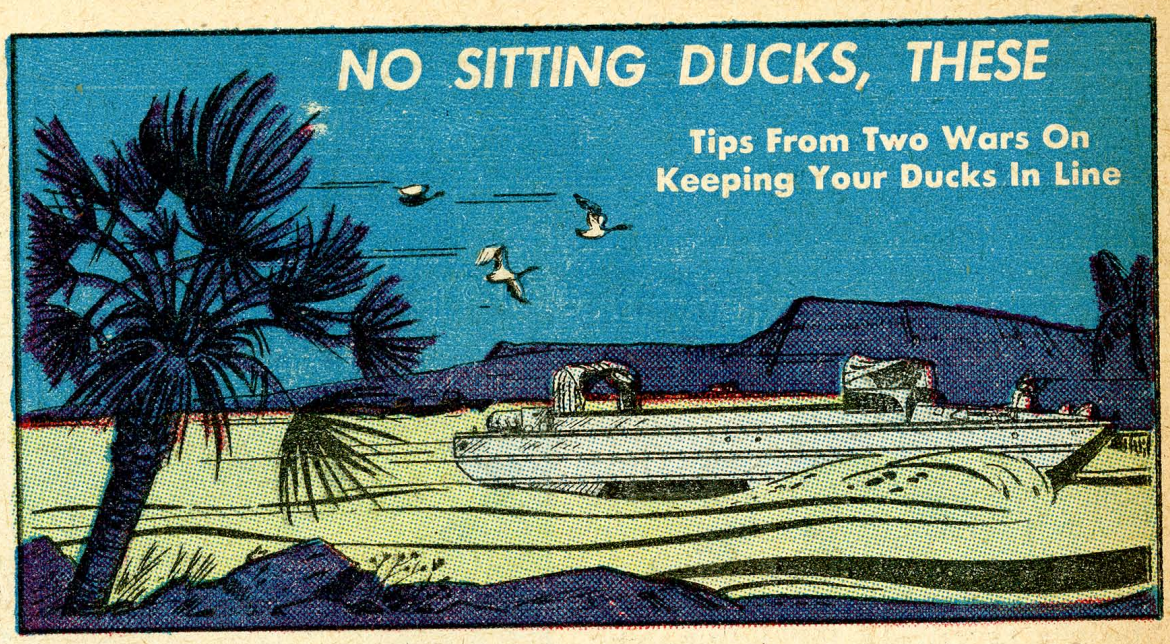
Dear Editor,

After reading a contribution by Lt. John N. Harmon in ARMY MOTORS (Apr. 44) on installing Chevrolet and GMC distributors, I'd like to make this suggestion. If you're working alone, use a crescent wrench or a 25/32" open-end wrench on the flat bar of the starter linkage just above the starter. You can then operate the starter while installing the distributor. Remember the clearance that must be maintained at the upper and lower ends of the distributor housing before tightening the clamp bolts.

Guy R. Spigle
Civilian Inspector

NO SITTING DUCKS, THESE

Tips From Two Wars On Keeping Your Ducks In Line



THE Ducks of the 453rd Amphibious Truck Co. waddled from one end of Europe to the other in World War II through a series of actions from D-Day to crossings of the Our, the Saar, the Moselle, the Rhine and what have you.

Though they weren't much to look at by the time the shindig was over, they were still alive and kicking. Here's some of the maintenance tricks used by the men of the 453rd to bring them through.

FANBELT FIND

Changing fanbelts on the duck with the tire-inflation system, for instance — Sgt. Tom W. Hansom, Duck and Truck Mechanic, learned from experience a much faster way of doing this job that often needs doing.

Unbolting the shaft at the engine, as recommended in the book, is too hard. It's too hard to get at the bolts that uncouple the drive-shaft. What Hansom does is unbolt the drive-shaft at the air compressor on the forward side of the radiator (Fig. 1). There's only four easy-to-get-at (with a ½" wrench) bolts there. Then just skin the shaft back (it'll slide back about an inch) and slip the fanbelt around the shaft.

Now to put the fanbelt on the other side of the radiator where it belongs, squeeze it through the hole in the core that the air-compressor shaft runs through, drape it around the pulleys, adjust it, bolt up the shaft, and you're done.

You cut the job down to about 5 minutes.

GENERATOR FINGER-FIX

When the ammeter ain't ammin' and a check shows that the generator ain't generatin', Hansom has learned to look for one little thing on his ducks. Salt

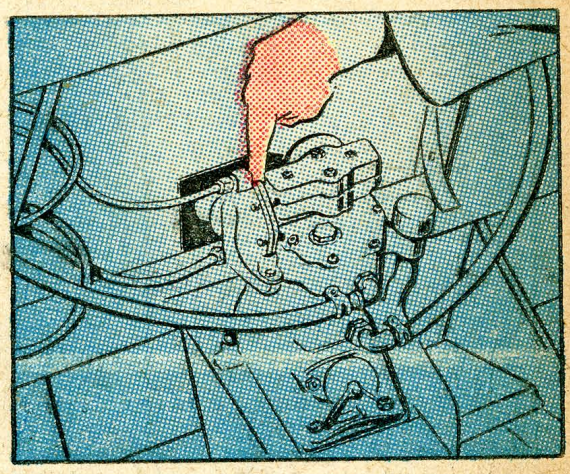


Fig. 1 — After you've loosened the bolts and slid back the shaft, all's left is to slip the new fanbelt right into place.

water, he says, creeps into the generator and corrodes the little springs that hold the brushes to the commutator. These stick and fail to press the brushes against the commutator.

Now, instead of frothing at the mouth and replacing the generator, Sgt. Hansom has taught himself a little trick that gets his generator back in service in the bat of an eye. All he does is flip open the commutator-cover band, reach in his finger, and flick the little arms or levers that work off the coil springs to press the brushes down (Fig. 2). This loosens the corrosion on the springs and gets the generator working instantly.

As you can imagine, this is no cure-all for corrosion in the generator, but as you can easily imagine, there are times and places when you've got to get going in a hurry. As far as the generator is concerned, this is the way to do it.

So the problem of protecting all electrical equipment (including the generator) from salt water, humidity, and fungus growth won't faze ya' in Asia, the best idea is to get your hooks on a copy of TB ORD 242, "Protection of Electrical Equipment On Ordnance Vehicles Against Corrosion and Rust" (15 Jan. 45).

Getting back to the brush springs, the bulletin tells how the springs can be protected against corrosion. But you've got to go easy—the corrosion-proofing compound (red glyptal paint), if slopped on too thick, may cause the brushes to stick in the holders and the brush levers or pins may bind. Another thing, glyptal is a good insulator and you don't want it to turn conductors into non-conductors.

To corrosion-proof the brush springs, do as follows: With the brush-plate assembly out, clean off all corrosion and rust (new springs should also be cleaned). Brush (brush only) a light coat of glyptal (not more than about .001" thick) on the brush springs, pins, or levers, and on the **outside surface** of the brush holders. (Keep paint off the inside of the brush holder where the brush rides.) The stuff dries in about two hours.

That ought to do the trick as far as the brush springs are concerned—but remember Sgt. Hansom's trick of flicking the little arms to free them; it may get you out of hot water in a hurry some day.

To do a complete and all-over corrosion-proofing job on the electrical system, get a hold of TB ORD 242.

LITTLE BUT OH MY . . .

Lots of little things cropped up to plague the men and ducks of the 453rd. The lights, for instance. The sealed-beam units in the head-lights get hot when lit. When the duck splashes into the water, the cold water strikes them and they crack. What's the answer? The answer, with sealed beams, is to remember that they'll crack if run into cold water while they're hot, so try not to use them for a couple of minutes before dunking your duck.

The little spring connections in the tail lights also go to pot when salt water hits them (Fig. 3). So the 453rd simply remakes the electrical connection by spotting a little ball of solder in place of the springs.

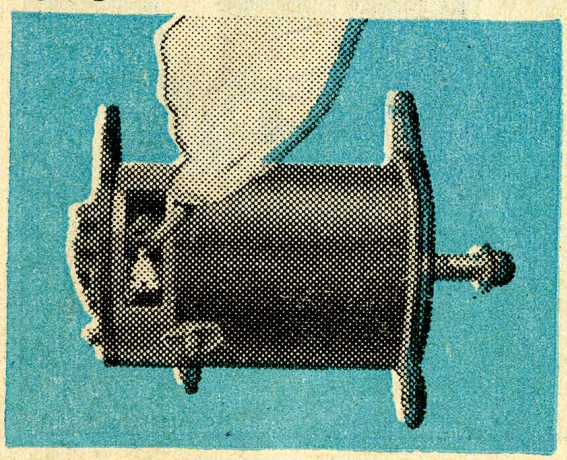


Fig. 2 — A quick flick of the levers is usually all that's needed to loosen up corrosion and start it generating again.

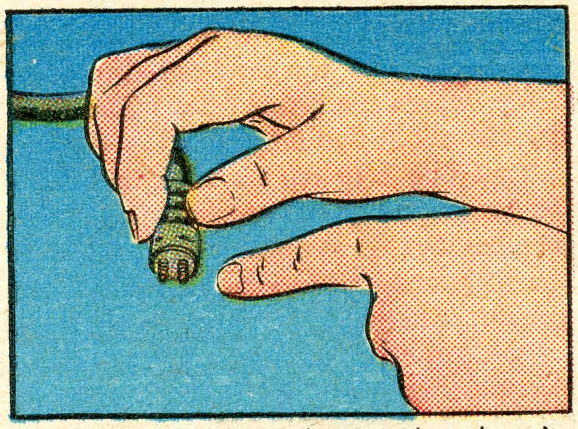


Fig. 3 — When the salt water has done its dirty work here, a couple drops of soft solder will take the place of the springs.

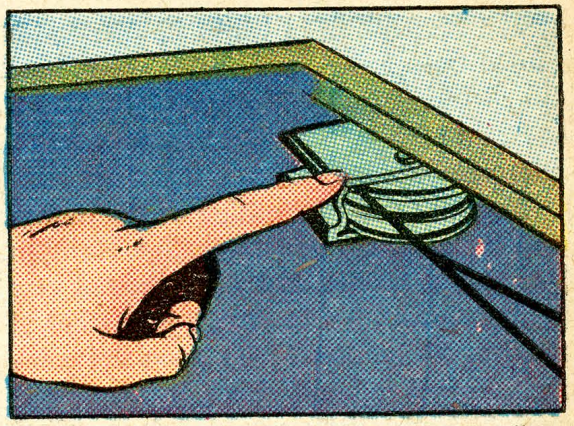


Fig. 5 — Keeping these composition pulleys well oiled is the secret of the fingertip rudder-control you've heard talked about.

The horn goes, too. It's no trick at all for salt water to find it. Whenever they can scrounge any, the 453rd replaces the old horns with air horns. They hook them up to the air-compressor system.

Like everybody else who had trouble with losing the bearing cap (Fig. 4) off the propeller-strut-bearing assembly, the 453rd welded a little chain on the cap so that when it did drop off, it wasn't lost forever. Caps are too hard to get.

The little pulleys that the rudder-control cables run through (Fig. 5) are made of some sort of fiber composition. Because the rudder should be sensitive enough to answer to fingertip control, the 453rd found it wise to keep the fiber pulleys well-oiled on their pins. Otherwise, corrosion causes the pulleys to stick, the cables wear through, and next thing you know, steering your duck is like steering a pair of dead horses.

The winch-cable guide located on the front of the hull (Fig. 6) sits up there asking for trouble. Nine times out of ten, whoever comes out to tow a stalled duck out of the water or mud, throws a hook or a line through the cable guide and uses it to tow the duck in. Not being designed for that particular job, the guide uproots and you're lucky if you don't wind up

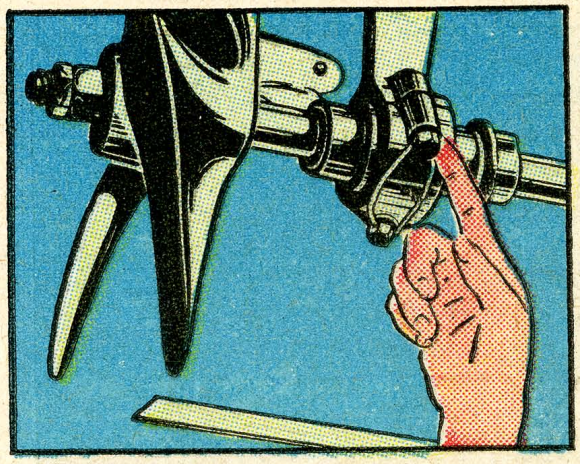


Fig. 4—Wired heads or not most people with experience about these things have welded chains here to save losing the bearing cap.

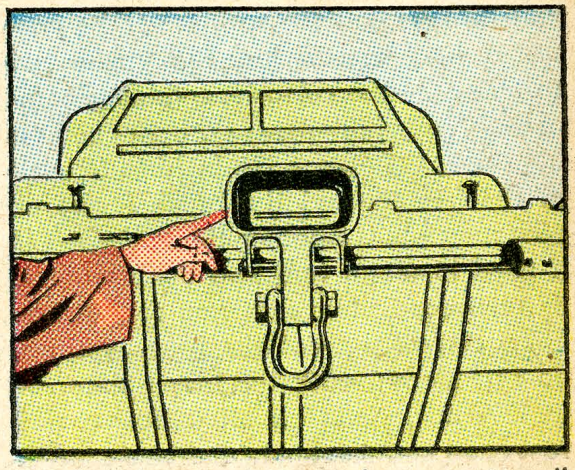


Fig. 6 — In case the guy who comes to pull you out doesn't know a winch-cable guide from a towing shackle, show him this one.

with a hole in the hull. The answer is advertising. Whosoever is charged with hauling in stuck ducks should be advised that the winch-cable guide is not a pintle hook —use the shackle furnished for the purpose, for towing from the bow.

Cracked exhaust manifolds occasionally popped up to annoy the 453rd. In many cases, the reason is in the hull drain plug that drains the bilge under the engine compartment. As the duck goes chugging along, the exhaust manifold gets red hot. If a couple feet of cold water is sloshing around under the engine, it strikes the manifold and crack goes the manifold. However, when time was a-wastin' and when replacement manifolds were amongst those missing, the 453rd did not worry its pretty head about manifolds. If the crack was not too bad, why they just went ahead and operated. As Cpl. John S. Fly of the outfit says, "What the hell, it doesn't hurt anything." Welding or brazing the crack would be safer.

After a couple of tires went flat suddenly and left a couple of Ducks in the middle of an embarrassing situation, the 453rd learned it was important to watch the various air connections of the tire-inflation system. You too, you may find yourself up against strange and dangerous types of terrain — coral and sharp rock, soft sand and "unknown landings," hard sand and boulders. Learn to maintain your duck's tire-inflation system.

All this and lots more, the men of the 453rd Amphibious Truck Company learned the hard way. The kind of places they went, the kind of things they did, they didn't have much choice—in the battle for Europe it was strictly sink or swim.

They swum.

TOW-HOOKS—*GIVE IT TO 'EM STRAIGHT*

You wouldn't think that anything as uncomplicated as tow-hooks would require special directions for use, but take a look at the sad-apple tow-hooks — some twisted, some pulled over — decorating many of our vehicles, and you'll begin to believe maybe they do.

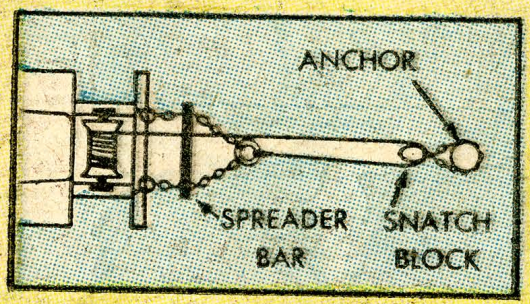
The whole story behind the use of tow-hooks is that they were never built to take a side-wise strain. A straight pull is the only thing they're guaranteed to stand up under. A pull from the side may bend them over, jerk up the mountings and generally cheapen the neighborhood around the front bumper.

One of the easiest ways to get a beat-up tow-hook is to hook the tow chain over one of the hooks, pass it around the other, and then pull. This exerts a side-wise strain with the results noted above.

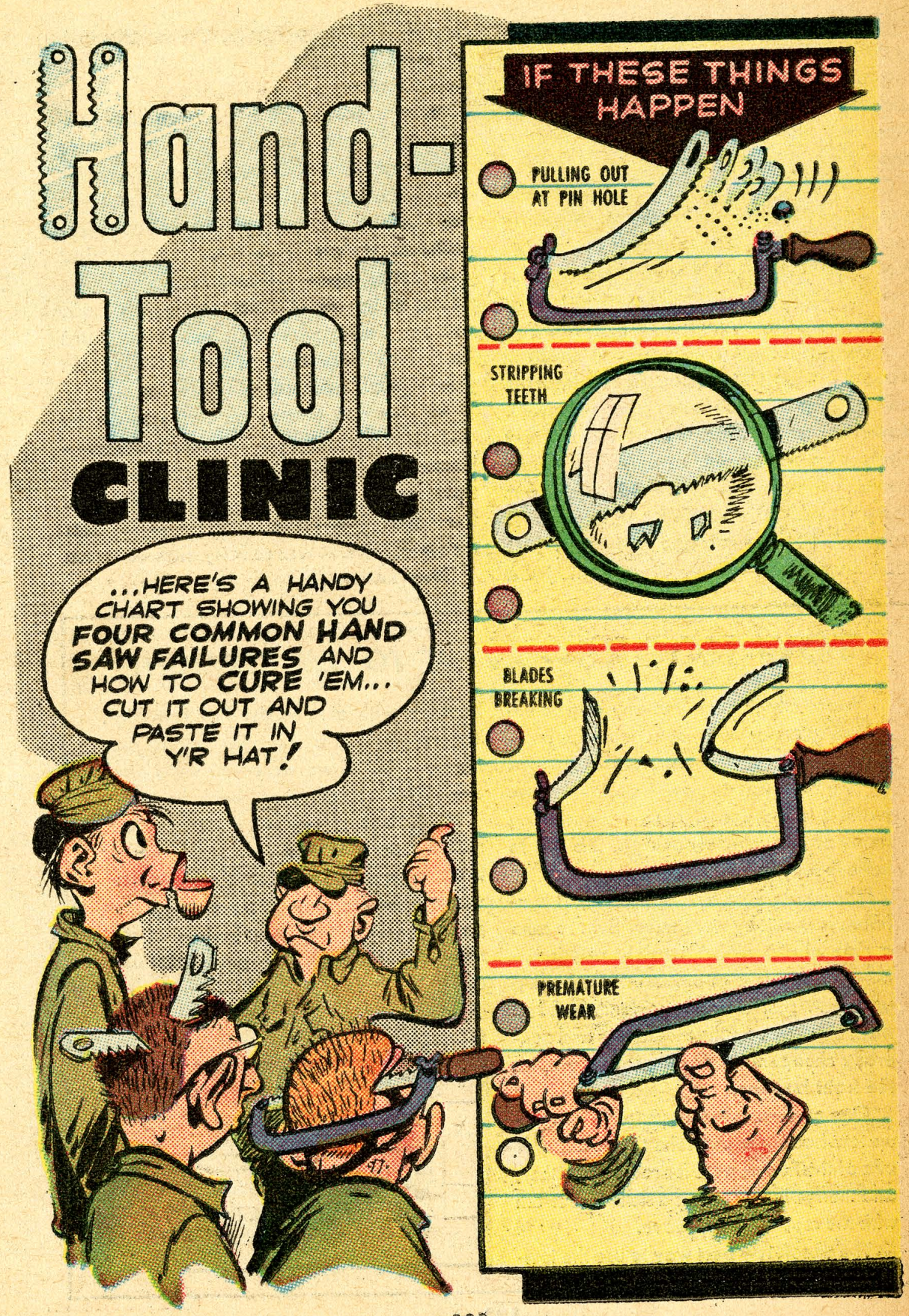
The absolutely best way to use the tow-hooks is with a spreader bar (see Fig). Where you get a spreader bar is your business, but if we were you we'd have one in our organization, hook or crook.

If you're caught without a spreader bar, rather than wrap the tow chain around both hooks thus exerting a side-wise pull, use only one hook to give it a straight-on pull. Of course, you've got to use discretion—a giant-size pull might conceivably distort the frame.

Remember: A straight pull and a careful pull.



Hand-Tool CLINIC



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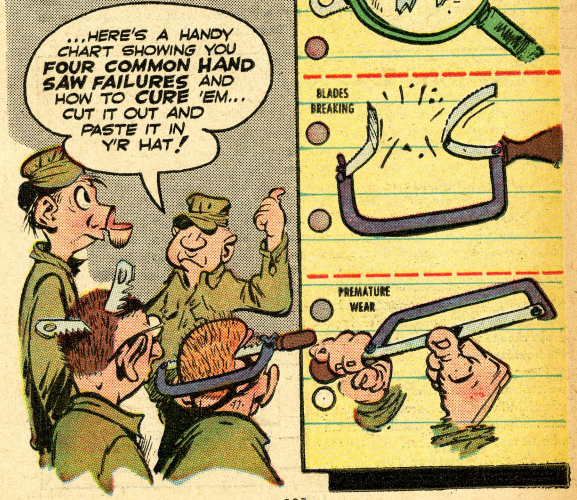
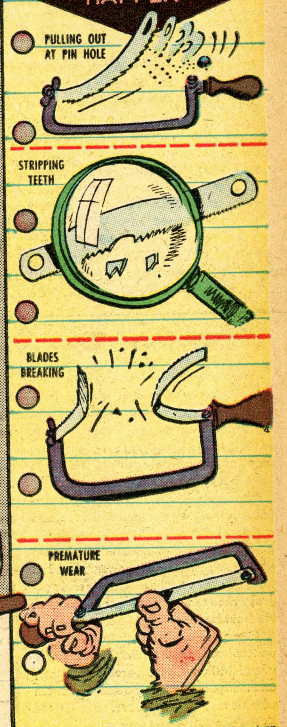
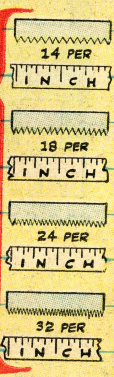


IF THESE THINGS HAPPEN



HERE'S WHAT'S WRONG.	...AND HERE'S HOW TO FIX IT.
THE BLADE'S TOO **TIGHT** OR Y'R **TWISTING** IN THE CUT.	REDUCE TENSION... ALLOW JUST **ENOUGH** TO HOLD BLADE **STRAIGHT.**

IT'S EITHER NOT ENUF **TENSION** OR Y'R USIN THE **WRONG** TOOTH SIZE OR Y'D BETTER STOP **BENDIN'** OR **TWISTING** THE BLADE OR Y'PROBABLY STARTED A NEW BLADE IN AN OLD CUT... BEST START A **NEW** CUT...



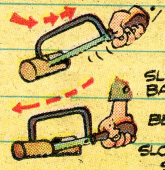
FOR MATERIALS EQUIVILENT TO ONE INCH ROUND OR MORE—ALUMINUM, BRASS, BRONZE, CAST IRON, COPPER, COLD ROLLED STEEL, STRUCTURAL STEEL, RAILS, ETC.

FOR MATERIALS ¼ TO 1 INCH IN DIAMETER, ALSO TOOL STEELS, DRILL ROD, COLD ROLLED STEEL AND MEDIUM WEIGHT STRUCTURAL SHAPES.

FOR MATERIALS ⅛ TO ¼ INCH IN THICKNESS. ALSO PIPE AND TUBING, BX CABLE, HEAVY SHEET METAL MOULDINGS, ETC.

FOR MATERIALS LESS THAN ⅛ INCH IN THICKNESS. ALSO TUBING, BX CABLE, SHEET METAL, MOULDINGS, ETC.

Y'R PUTTIN' TOO MUCH PRESSURE ON THE **BACK STROKE**... OR Y'R NOT USING **ENOUGH** PRESSURE.



LIFT SLIGHTLY ON BACK STROKE AND BEAR DOWN ON SLOW FORWARD STROKE.

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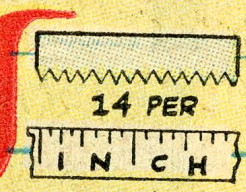

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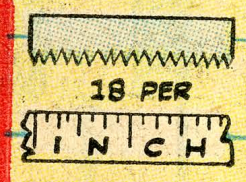

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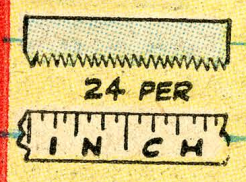

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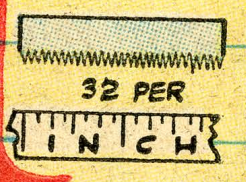

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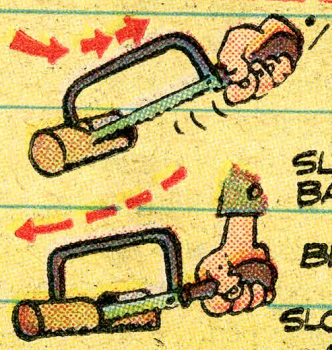
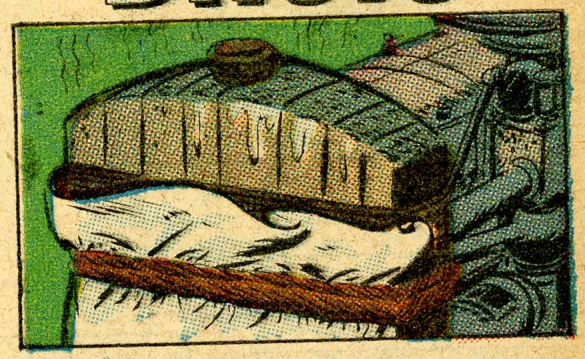
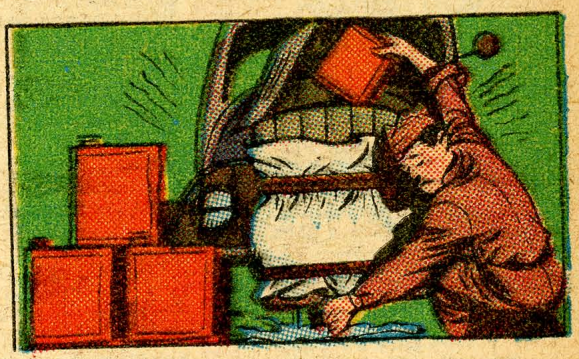


LIFT SLIGHTLY ON BACK STROKE AND BEAR DOWN ON SLOW FORWARD STROKE.

BASIC





REMEMBER that embarrassing day (just last week, maybe) when you had to bundle your jimmy off to a higher echelon for a not-so-royal flush? Yeah, it couldn't be helped. That cooling system was acting like it didn't know its purpose from a hole in the ground. The heat indicator was pointing straight to trouble —the engine was stewing in its own rusty juice and oil . . . and corruption.

So what **could** you do about it?

You are right. By that time you had no choice. But something should have been done, long before. Given the right kind of **preventive** cleaning at the right times, no self-respecting cooling system would ever get fouled-up enough to need **corrective** cleaning. That's a fact.

In TM 37-2810 even the before operation preventive maintenance services on motor vehicles include taking a careful taste of the coolant for contamination—and cleaning out the cooling system if you notice a strong taint of iron, quinine, or strychnine. On full-track and tank-like vehicles, the procedure is the same (in brief: wherever liquid cooling systems are involved).

And here's how you go about doing what the book says: First, you remove the radiator cap (approach with respect if it's pressurized), then insert a hydrometer, and hoist a sample of the coolant up to where you can see what it looks like. Not when the stuff's cold. Do it after the engine's been warmed up to normal operating temperatures and while it's **still running** at a fast idle. Otherwise, your sample won't show what's going on.

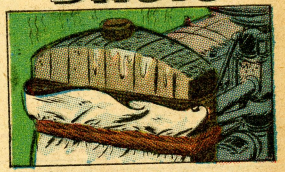
Well, how does she look? Pretty—or pretty horrible? If you notice rust particles, oil contamination, flotsam or jetsam in the coolant, that's your cue for draining right then and there.

To make things as clear as your coolant should be, let's break this down into four mincing steps: Cleaning, neutralizing, flushing and installing.

CLEANING

The idea here is to get out as much foreign matter as possible, by the simple process of draining then follow through with the cleaning compound. So open all valves leading to heaters and similar gadgets to let the coolant circulate completely. Then cover the front of the radiator with cardboard, or anything else that will keep the fan from sucking fresh air over the cooling fins, and run the engine until the temperature climbs to the

BASIC



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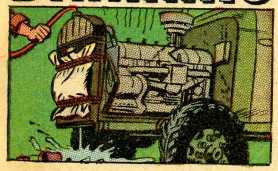
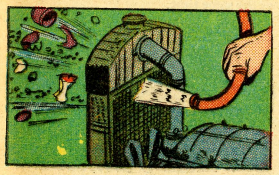
To make things as clear as your coolant should be, let's break this down into four mincing steps: Cleaning, neutralizing, flushing and installing.

CLEANING

The idea here is to get out as much foreign matter as possible, by the simple process of draining then follow through with the cleaning compound. So open all valves leading to heaters and similar gadgets to let the coolant circulate completely. Then cover the front of the radiator with cardboard, or anything else that will keep the fan from sucking fresh air over the cooling fins, and run the engine until the temperature climbs to the

DRAINING





normal operating range. Stop before it gets to the boiling point. Take off the radiator cap, open all drain cocks, and drain out the whole mess. If any drain holes are clogged with grime, use a length of wire to tickle them open.

When the dripping stops, you use the cleaning compound. Under Federal Stock No. 51-C-1568-500, the cleaning compound is a packaged item: a 1-pound container of cleaning compound and a 4-ounce container of neutralizing compound. If you mix them together, you get nothing usable—they cancel each other out. The scheme is to use the cleaner first to dissolve grease and grime, and then use the neutralizer to prevent harmful after-effects. Just like taking fizz after firewater. (No reflection on your firewater, but this cleaning compound is a blend of strong acid—so you'll want to avoid slopping it on things like skin, clothing, or vehicle paint)

Back to work. When the coolant has completely drained from the system, close all the drain cocks again. Disconnect the radiator overflow tank (if your vehicle has one), and let the engine cool to below 200° F.

For each four gallons, or thereabouts, of cooling system capacity, pour one container of cleaning compound into the radiator. Fill the rest of the way with water and replace the radiator cap.

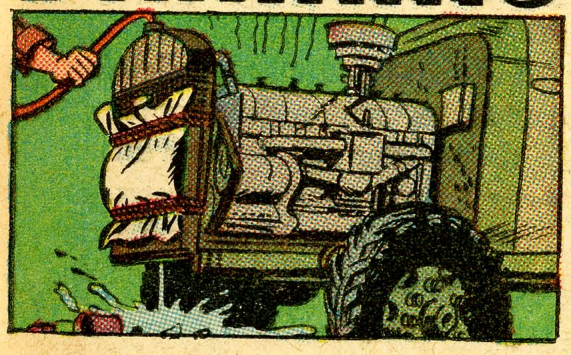
If your vehicle does have an overflow tank, switch the pressure cap over to the radiator during the cleaning action. Also, put a clean drain pan in position to catch the foaming overflow—then you can use the drippings, if you need to to bring the radiator liquid up to level.

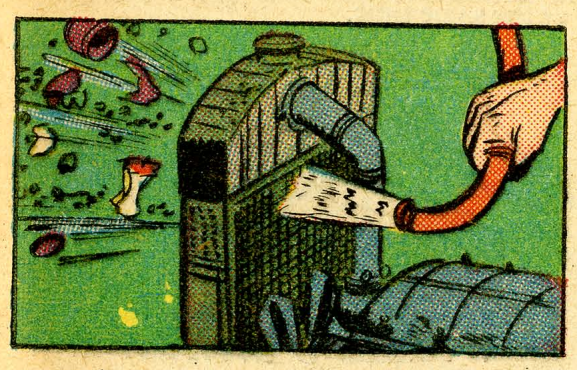
Next, run the engine at a fast idle for half an hour. Heat makes the cleaner work better, so get the engine temperature up to at least 180° (but not over 200°) and keep it there. Use the radiator cover again—on and off as required—to keep within this heat range.

If you let the mixture boil or the engine overheat, you'll have to stop and wait until the gauge drops below 200°, remove the radiator pressure-cap, pour the overflow back into the system, put the cap back on the radiator, and start the engine once more to finish your 30-minute run.

When time's up, shut off the engine and drain the system thoroughly, removing the radiator cap and opening the drain cocks. If everything has gone according to plan, all the junk that's **coming** out will run out with the cleaning compound.

DRAINING





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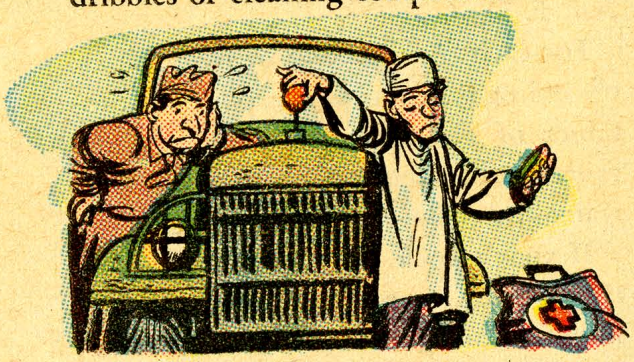
NEUTRALIZING

Here's where you clean up after the cleaner. As we said before, this cleaner is a strong acid—a tough character. Let it linger in the cooling system and it'll probably creep out by making its own new exits. So you've got to neutralize those dribbles of cleaning compound.



Shut go the drain plugs again. In goes the neutralizer (one 4-ounce container for each four gallons of cooling system capacity). In goes the water again to fill up the system. On goes the radiator cap. On goes the engine, too, at fast idle. Use the radiator cover, if you need it to bring the engine temperature up to 180 degrees.

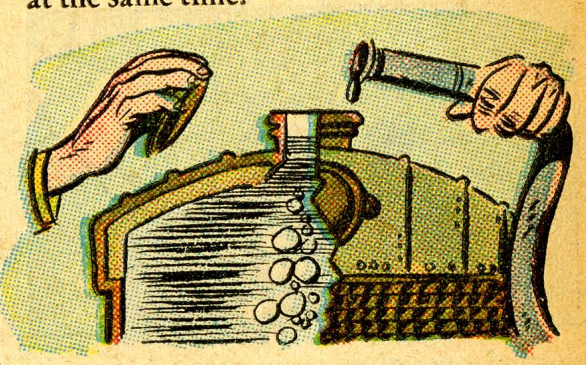
A 5-minute run will do the trick this time, but if you have a few minutes to spare, it's no harm to circulate the neutralizer a wee longer. Once again: stop the engine, remove the radiator cap, open all drain cocks, and let the neutralizer gush forth.

FLUSHING

Since every trace of the cleaning compound or the neutralizing compound must be got out of the system, this step is an important part of the proceedings. Repeat exactly what you did with the neutralizer, only fill her up with plain water this time. A 5-minute run, at not less than 180° and not more than 200°, followed by the fourth draining.

You may find it a good idea to double flush with the water. There's times that it takes the fifth draining to produce clear water.

And to really complete the flushing operation, it's smart to clean out the valves in the radiator cap. Spray a stream of water (if you can get hot water, good) through the holes in the valve cage—move the pressure valve up and down, with a blunt piece of wood or a pencil, at the same time.



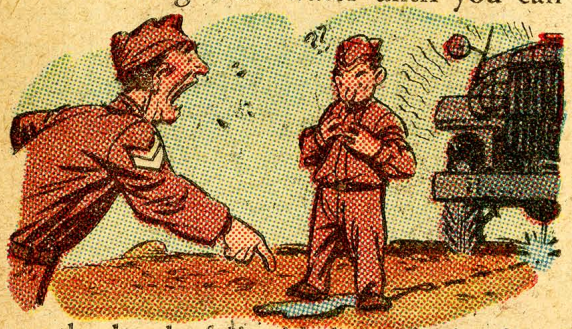
Clean out the overflow pipe while you're at it. Rinse the overflow tank and connecting tube with water. And use your compressed air gun, blowing from the rear of the radiator, to blast out dirt, trash, and insects imbedded in the air passages of the core. You can do this with a stream of water, too, but don't use steam. And whether you use an air hose or a water hose, remember that too much pressure will damage the radiator. Keep the hose at a safe distance.

Before leaving this flushing operation —a word of caution. One way not to flush a cooling system is to shove a hose in the radiator with the engine running and the drain plugs open. That procedure closes the thermostat valve, stopping circulation and preventing the water from rinsing through the engine. An-

other important thing: Never fill an overheated engine with cold water. You can easily crack hot metal with a surprise douche. Let the engine cool to below 200° before you pour in cold water. You shouldn't let your engine go above that heat during this cleaning business, anyway.

INSTALLING

For the last time, shut the drain cocks. Then, proceed to fill your radiator with whatever the climate calls for. If it's compound, inhibitor, corrosion, you fill the cooling system **almost** full with clean water, first. Then add the inhibitor in the familiar proportion — one container for each four gallons of system capacity. Finish filling with water until you can



see the level of liquid through the filler neck, leaving just enough room for expansion. Put back the radiator cap, and run the engine at fast idle until the heat indicator shows normal operating temperature. Stop the engine and check your coolant level again. You may need to add more water.

If your days are getting shorter and you feel a nip in the air, and you know the temperature's on its way down—then compound, anti-freeze, ethylene-glycol type, is in order. Fill the system about one-quarter full of clean water and dump in enough anti-freeze for the lowest expected temperature (there's a chart in your TM). Add more water, again leaving room at the top for coolant expansion. Start the engine and run it up to normal temperature. Shut it off and add water, if needed, up to the coolant level for your particular vehicle — no higher. Another good idea is to snare a copy of TS 700-20. It'll answer any of the questions you may have on anti-freeze installation.

LEFT-OVERS

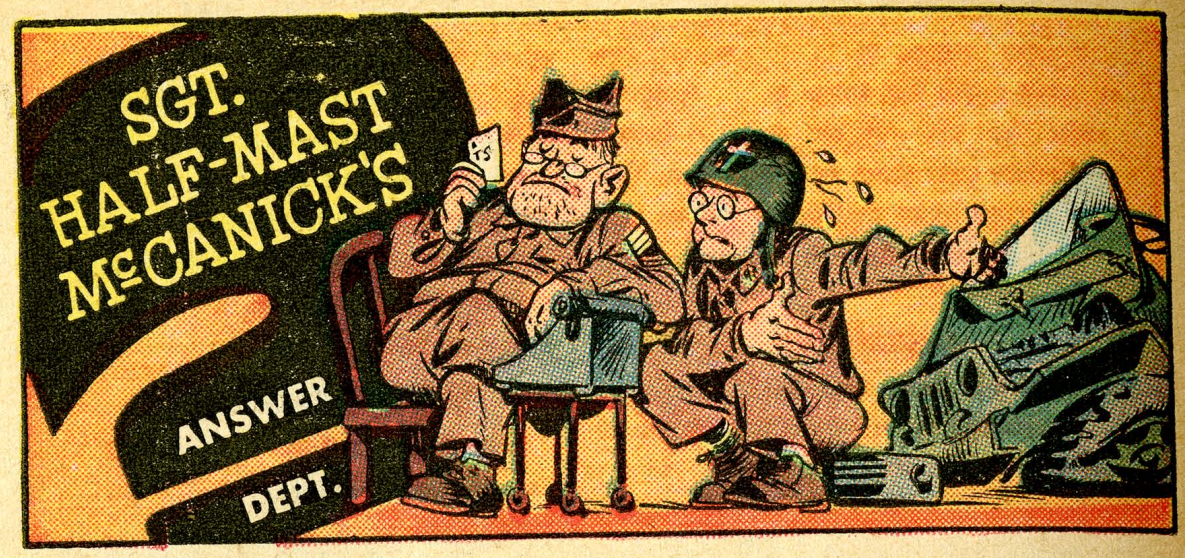
Just because leaks haven't been mentioned, don't assume there won't be any. Keep your good eye open for leaks anywhere in the cooling system, anytime during this whole operation.

The cleaning solution may close some leaks in passing, or it may expose other leaks previously plugged tight by the rust and corrosion. Naturally you will fix or report all leaks — whichever you know best.

If you go to town on this draining business, and also get particular about what goes into the radiator and what (if anything) leaks out of the hose—there just won't be any more of those embarrassing trips into higher-echelon with a melting engine.

At this point it is recommended that before retiring you sip from a cup of warm milk, and trust that you will avoid bad dreams about cooling systems.

And their pet cocks.



Dear Half-Mast,

Should the front-wheel innerbearing on a GMC 2½-ton 6x6 fit tightly on the steering-knuckle assembly, as the factory turns them out, or should the bearings be able to slide freely, having approximately .010" clearance between the bearing cone and the steering-knuckle assembly?

We'd also like to know if the front-wheel inner-bearing oil seal (GM-3665138) is interchangeable with the retainer (2031378) and felt (2031377) on the Timken front axle?

Sgt. F. W. W.

Dear Sergeant,

The right fit for the front-wheel inner-bearing cone on the front-axle spindle should be a "creep" fit — to let the cone creep slightly around the spindle when you're hauling a specially heavy load. That way, the bearing-surface area that gets the load is changed a little at a time, so it wears even. Trucks now in production have either a slight press fit or an easy push fit on the spindle, depending on who builds 'em. But if you're rebuilding a used front axle, you could have the bearing-spindle diameter .003" smaller than the inside diameter of the cone. It should never be .010", through, because that much would damage the bearings and the spindle.

As for interchanging the frontwheel inner-bearing oil seal, and the felt and retainer — I wouldn't do it, Sarge. It's physically possible, but unless the sealing surface of the split-type-axle spindle is polished after the retainer is removed, to provide a smooth surface for the seal lip, the seal will wear out long before its time.

HALF-MAST

Dear Half-Mast,

We've had a lot of front springs break on our 2½-ton GMC's, so we took leaves from Chevrolet rear springs and cut them to fit our GMC trucks. Also added two of these leaves to the original nine leaves on the truck. This made the riding slightly harder, but it eliminated the breaking. We suggest GMC springs be made 2½" wide with eleven leaves. What do you think?

CWO C.G.

Dear Mr. G.,

I look at it this way: With the front springs 2½" wide, they probably wouldn't break when the truck's jouncing over rough terrain — but, other parts would snap and crack, such as frame and axle assemblies. Some one part has to be left weak and "shock-absorbent," and that part's the front springs.

Sometimes old leaves, taken from broken springs, may be corroded or have slight cracks you can't see — and when they're used to rebuild springs, they'll shorten spring life instead of prolonging it. So any old leaves should be cleaned thoroughly with a wire brush or buffer, and a sharp eye should be cast over them for flaws.

Got some basic maintenance tips that may help save your springs:

(1) Tighten spring clips and U-bolts regularly, and be sure there isn't any rust or dirt around them to keep the clips from being properly tightened.

(2) Over-tightening the shackle bolts'll cause the leaves to break near or at the spring eyes. Draw the nuts up as tight as possible, then back them off one-half turn so they don't bind.

(3) Grease or dirt on the brake linings, loose backing plates, or a quick stop at the same time the front wheels hit a deep rut or rock, will set up all kinds of spring deflection.

(4) Two different springs, with different carrying capacities, are used on 2½-ton 6x6 GMC's. GM2140053 is one front-spring assembly that carries 1500 lbs.—it's used on trucks without winch. GM-2140052 carries 1800 lbs. and is used on trucks with winch.

(5) Keep the axle-to-frame bumper blocks in good shape, or they'll let the springs go too far in reverse camber (arch).

(6) Don't lubricate spring leaves, as I've often said before—the lube takes away the friction between the leaves and reduces their load-carrying ability. Sometimes grease gets into spring leaves from over-lubing the spring-shackle bolts, with the same sad result.

And (7) Read "GMC SPRINGS" on page 30 of the June P. S.

HALF-MAST

Dear Half-Mast,

On two different occasions we've had 2½-ton GMC's lose their left-rear wheels. Whether it was due to the negligence of the mechanic (failing to lock the lock-washer or whether the bent over part of the washer broke, allowing the nut to loosen, I don't know). But to make things easier, why don't manufacturers make the locknut and spindle with left-hand threads, so if either of those things happens, the locknut will tighten instead of come loose?

Sgt. N. M.

Dear Sergeant,

It looks from here like you can blame the loss of those two left-rear wheels on the driver or mechanic. Because if the mechanic had locked the adjusting nut properly in the first place, it shoulda stayed put. And if the nut did come loose, the driver shoulda noticed an overdose of brake drag and yelled about it before anything else had a chance to happen.

As for locknuts and spindles with left-hand threads, the manufacturers did try that once, but they stopped making 'em because the torque that sometimes winds the nut loose can also wind it too tight if it isn't locked correctly. That'd mean bound and overloaded bearings. And then, the way it is, there ain't as many parts to be manufactured and stocked, and you get interchangeability in the bargain.

It might help you to know that there are various types of lock-washers used to lock the wheel-adjusting nuts securely — three different types on GMC's alone. First, there's GM-657023, which is perforated, and locks the adjusting nut when the holes in the washer line up with the dowel pins in the nut and the inner tang rests in the spindle groove. Next is GM-072415; this is a split-type washer, and locks the adjusting nut by bending the inside half (and part of the outer half) of the washer over the nut, with the tang

in the spindle groove and the locknut pulled up tight against the washer. Then there's GM-3660090, with tangs spaced around the outer edge and one on the inside which fits in the spindle groove; the nut is locked by bending the outside tangs in the notches of the nut. All clear?

HALF-MAST

Dear Half-Mast,

Here's a joker on Willys jeeps we've run into and puzzled over—front-wheel alinement.

When all adjustments were made and clearances were normal, if the steering wheel was placed in position for the mid-point of gear mesh, the front wheels were 3 degrees, more or less, away from the straight-ahead position they should be in. Moving the pitman arm one spline on the sector shaft changed the steering-wheel rim travel 18". We're trying to correct an error of about a half a spline, an average of 9" measured at the steering-wheel rim, or 7/16" or less of drag-link travel.

This was the adjustment procedure we followed: Disconnected the drag-link, checked for defective springs and ball seats, or pitman ball-end; checked for column bind at the dash, adjusted the worm bearings and mesh of the worm and sector; single chalk-marked the steering wheel's lower rim for the mid-point of gear mesh, and tightened the column to the dash. Then we adjusted the bell-crank-shaft nut and also the toe-in (squaring bell crank to front axle); checked the front end of the drag-link for defects and proper adjustment; connected the rear of the drag-link to the pitman arm; placed the front wheels in straight-ahead position, and double chalk-marked the steering wheel's lower rim for straight-ahead of the front wheels.

In many cases, the two different chalk marks were from 2" to 9" apart. And there's our problem.

We've checked our bell crank and pitman arm for bend, and measured the drag-link for variation in length a number of times and rarely found any defects. Several bell cranks and pitman arms, discarded because of worn ball-ends, were tested in the hydraulic press.

A lot of remedies were tried, but what we want is the correct solution to this problem. If you've followed us this far, now is your cue to step out and give the ka kazook kazook ka zam to our chestnut.

Combined Maintenance Service
Shop No. 1

Dear Combined Maintenance,
Service Shop No. 1,

You sure gave me plenty of clues, and I've sherlocked your problem all the way from the zook to the zam.

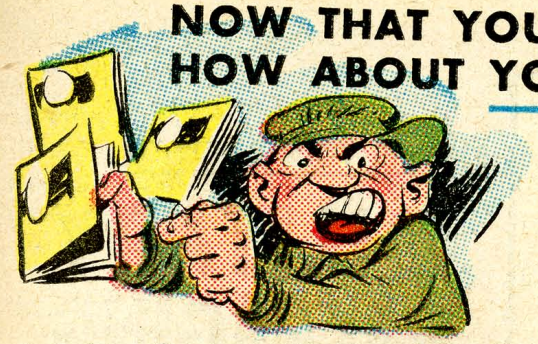
There's still another angle you can work on. The tie-rods could be improperly adjusted when squaring the bell crank to the axle (see TM 9-803, page 187). And it seems to me, if your steering gear is at the mid-point, the drag-link attached and the wheels 3 degrees away from the straight-ahead position, you should be able to adjust both halves of your tie-rod enough to straighten the wheels.

HALF-MAST

FREE! FREE! FOR THE ASTIN'!

P.S. is now yours for the astin'. Through special arrangement with nobody in particular, Half-Mast is offering free personal subscriptions by direct mail to people who ast good, publishable questions. Are you up to the sweetbreads in problems? Do you find yourself up maintenance creek without any oars? Write your burning questions to "Dear Half-Mast," P.S. MAGAZINE, Aberdeen Proving Ground, Maryland. If they're important enough to be published, you'll get a personal subscription. Even if they're not, you'll get an authoritative answer.

NOW THAT YOU'VE SEEN 3 ISSUES HOW ABOUT YOU SOUNDIN' OFF!



Let's hear from you. PS Magazine has a big job to do—and if we can't please everyone, we'll try to come mighty close.

What are your gripes and pleasures? Why not let Half-Mast solve that problem you've been sleeping on? He's a top-kick with a big heart — tell him your troubles.

And if you've got a bright idea, or built a better gimmick, don't hoard it. Somewhere, someone else is maybe stewing over the same grief. If your idea's good, we'll pass it along and you'll earn yourself a free, one-year personal subscription to PS Magazine.

There's only one plea we make: when you write — give us the facts. Include things like Manufacturers' names, vehicle model, part names, sizes, shapes. Detail the trouble — how did it happen, when, under what conditions, how often? Tell us how and why and where and when and what-not about your solutions. If you've got a picture or can scribble one, shoot it along.

Forget about form and fuss—you can write on T. P., as long as it's complete. Then—if we get all the facts—you'll get some intelligent results.

IF YOU CAN WRITE, GRAB A STUBBY PENCIL — FINGERS EXTENDED AND JOINED — FILL IT OUT, SHOVE IT IN AN ENVELOPE AND SEND IT TO: PS MAGAZINE, ABERDEEN PROVING GROUND, MD. WE'LL SURE APPRECIATE IT.

TEAR OFF THIS FORM OR MAKE YOUR OWN

SEND NO MONEY

GIVE US A BRAKE!
You can help a lot by answering these questions.

1. When did you get this issue of P. S. Magazine? _____

2. Did you get the magazine from the Motor Officer, the Co Day Room, or the Motor Sergeant, or where? _____

3. Do you think your outfit has been getting enough copies? And if not, how many more do you need? _____

4. Did you know that Circular No. 26 (2 April 51) details the distribution basis for P.S. Magazine?* _____

5. What did you find in this issue, or other issues, that helped you in some way—told you something that maybe you didn't know before? _____

6. Is there something special you'd like to see in P.S. Magazine, some article you think would be useful? _____

*Section IX, Par. 2, which ends by telling you that:
"Limited stocks of the latest monthly edition will be available in Adjutant General publications depots to meet additional requirements."

NAME _____
ORGN. _____
APO No. _____
c/o POSTMASTER _____

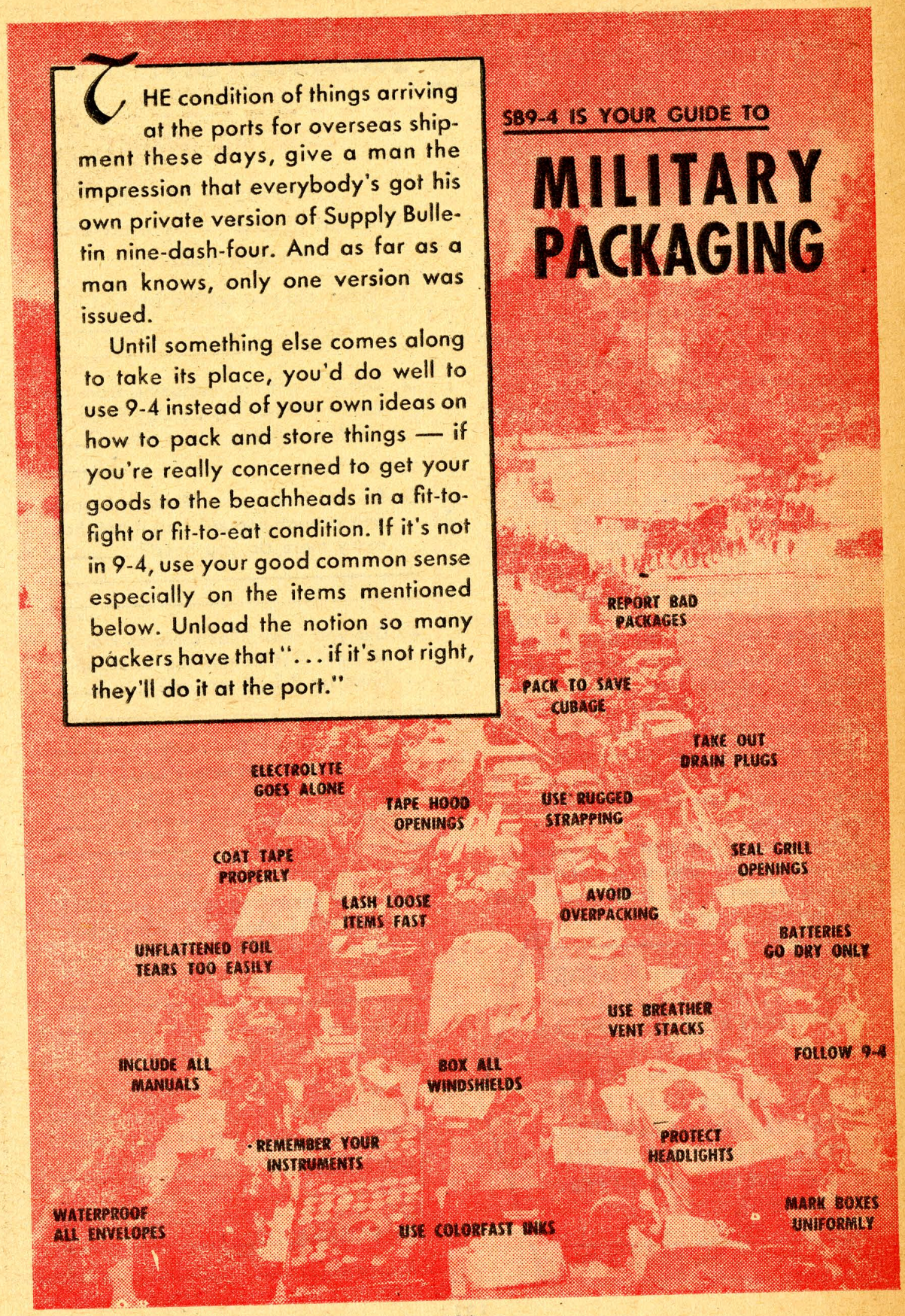
SEND NO MONEY

SB9-4 IS YOUR GUIDE TO

MILITARY PACKAGING

THE condition of things arriving at the ports for overseas shipment these days, give a man the impression that everybody's got his own private version of Supply Bulletin nine-dash-four. And as far as a man knows, only one version was issued.

Until something else comes along to take its place, you'd do well to use 9-4 instead of your own ideas on how to pack and store things — if you're really concerned to get your goods to the beachheads in a fit-to-fight or fit-to-eat condition. If it's not in 9-4, use your good common sense especially on the items mentioned below. Unload the notion so many packers have that "... if it's not right, they'll do it at the port."



BETWEEN THE LINES

LETTER FROM ALASKA

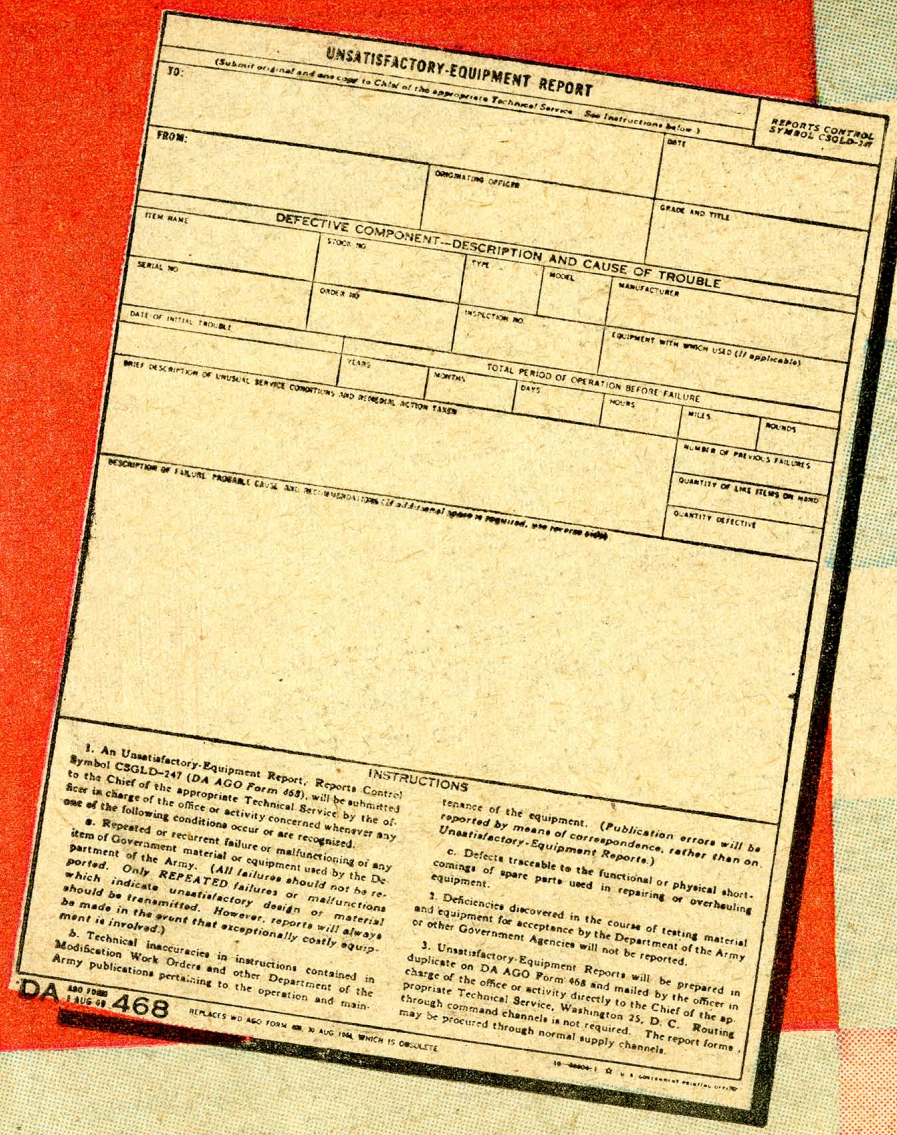
Dear Editor,

You sure make pretty speeches about how to keep 'em rolling, get 'em off the dead-line, etc. And you're so right. But morale counts, too! Here in our MAM Company, far from stateside, our "what-all" to work with gets shipped to us. On top of our normal supplies this trip, we've got 53 new and/or rebuilt engines hogging tons of our ship cargo-space. Sure, we'll get vehicles off the dead-line, but you should get an earful of the choice language when the stuff is uncrated. They'd dang well rather see a few ping-pong tables and a building to put them in. And you can't ride hard-herd on a bunch of men when you'd rather echo their griping. Maybe you think battin' balls around isn't a fit pastime? Nights, up here, are longer than you think.

Editor's Note: A friend of ours overcame this sad state of affairs by using a blue pencil. He rode "hard-herd" to make sure his men weren't requisitioning equipment they really didn't need. Asking for new and/or rebuilt engines is the easy way. It takes only one good look to tell if a request for major overhaul can be handled by a set of new plugs, or new points, a condenser, a sharp tune-up.... at the most, maybe rings and pins. Enough of these parts for half of Lt. Fredericks' deadline wouldn't weigh as much as one engine. He'd have cargo tonnage to spare, his men would have athletic equipment, and the nights could get shorter.

Lt. Philip Fredericks

BETTER than a P.S. slip!



UNSATISFACTORY-EQUIPMENT REPORT

(Submit original and one copy to Chief of the appropriate Technical Service. See instructions below.)

TO:

REPORTS CONTROL SYMBOL CSGLD-247

FROM:

DATE

ORIGINATING OFFICER

GRADE AND TITLE

DEFECTIVE COMPONENT—DESCRIPTION AND CAUSE OF TROUBLE

ITEM NAME | STOCK NO. | TYPE | MODEL | MANUFACTURER

SERIAL NO. | ORDER NO. | INSPECTION NO. | EQUIPMENT WITH WHICH USED (If applicable)

DATE OF INITIAL TROUBLE | TOTAL PERIOD OF OPERATION BEFORE FAILURE: YEARS | MONTHS | DAYS | HOURS | MILES | ROUNDS

BRIEF DESCRIPTION OF UNUSUAL SERVICE CONDITIONS AND REMEDIAL ACTION TAKEN

NUMBER OF PREVIOUS FAILURES

QUANTITY OF LIKE ITEMS ON HAND

QUANTITY DEFECTIVE

DESCRIPTION OF FAILURE, PROBABLE CAUSE, AND RECOMMENDATIONS (If additional space is required, use reverse side)

INSTRUCTIONS

1. An Unsatisfactory-Equipment Report, Reports Control Symbol CSGLD-247 (*DA AGO Form 468*), will be submitted to the Chief of the appropriate Technical Service by the officer in charge of the office or activity concerned whenever any one of the following conditions occur or are recognized.

a. Repeated or recurrent failure or malfunctioning of any item of Government material or equipment used by the Department of the Army. (*All failures should not be reported. Only REPEATED failures or malfunctions which indicate unsatisfactory design or material should be transmitted. However, reports will always be made in the event that exceptionally costly equipment is involved.*)

b. Technical inaccuracies in instructions contained in Modification Work Orders and other Department of the Army publications pertaining to the operation and maintenance of the equipment. (*Publication errors will be reported by means of correspondence, rather than on Unsatisfactory-Equipment Reports.*)

c. Defects traceable to the functional or physical shortcomings of spare parts used in repairing or overhauling equipment.

2. Deficiencies discovered in the course of testing material and equipment for acceptance by the Department of the Army or other Government Agencies will not be reported.

3. Unsatisfactory-Equipment Reports will be prepared in duplicate on DA AGO Form 468 and mailed by the officer in charge of the office or activity directly to the Chief of the appropriate Technical Service, Washington 25, D. C. Routing through command channels is not required. The report forms may be procured through normal supply channels.

DA AGO FORM 1 AUG 52 468 REPLACES WD AGO FORM 468, 30 AUG 1944, WHICH IS OBSOLETE.

DA AGO Form 468 (Unsatisfactory Equipment Report, above) will do you more good than a U.S. Slip. Here's the chance for you fellas who've been crying out loud, "I coulda done a better job of building this $ % # & ¢ @ * & % thing blindfolded"—to put up or shut up. Form 468 gets your complaint back to the people who can and *will* do something about it. Just give 'em the facts. Report chronic ailments or defects in anything — vehicles*, guns, or any old barracks bags (equipment peculiar to the AF not included). Fair wear and tear doesn't count.

If you cured the trouble, don't keep the how-you-did-it to yourself—send it along via Form 468. It might help other suffering joes — it might be good enough to incorporate in production.

***When it's vehicles, write us, too**